6. The System Stress Environment

This section discusses the behavior of the ECS under stressed conditions. Stress occurs when normal loading on the system is exceeded. Stress on the system can be caused by a number of different events, both user and system driven. Typical science driven events were discussed and documented at IDR B (705-CD-005-001 - Day 3 AE1). The four stress conditions discussed were:

- Spectacular Event - This is when a geophysical event (e.g. a volcano) causes the system to be saturated by a large number of requests for data over the same area.
- Huge Data Request - This is where a single request comes in for an abnormally high volume of data (e.g. 5 years worth of a particular product).
- High Priority Request - This is where a single production request is made that the DAAC Manager wants to give immediate attention to independent of the currently planned work load.
- Science Product Correction - This is where due to algorithm correction or recalibration the entire standard product set of an instrument needs to be reprocessed, and redistributed.

While none of the above are common occurrences in the ECS, all of them can reasonably be expected to occur at least once per instrument during the lifetime of the ECS. When an event like these does occur then the system must behave in a controlled fashion by:

a. Recognizing the abnormal condition and alerting operations staff, and
b. Maintaining acceptable performance levels throughout the system as a whole whist corrective strategies are being implemented.

By definition the system is not designed to handled in a fully automatic fashion abnormal load conditions. The system, however, must be capable of recognizing such conditions and performing a smooth degradation of performance until a suitable strategy can be implemented at the DAAC.

The predominant cause of system stress from non-science users (i.e. internal) is through resource unavailability either because of hardware failure, or mode managed reduced operations for system testing. In either case the effect is a reduced DAAC capacity , and then the science driven conditions above begin to come into effect at ‘normal’ loads.

When the type of events described above occur, stress can manifest itself in a number of places within the system:

- Sessions - One of the most fundamental limits on the ECS performance is the number of simultaneous sessions that can be supported. Sessions are maintained both in the Information Manager & the Data Server.
- Working Storage - The capacity of the intermediate storage used for both Push & Pull.
- Processing Capacity - Sized to cope with standard production loads and scaled for normal reprocessing loads.
- Planning Timeline - Designed to support regularly planned and coordinated processing.

In the section below some specific scenarios that highlight the stress events described above are outlined. In section 6.2 detailed scenarios describing the mitigation strategies are given.

6.1 System Stress Scenarios

The following section outlines two specific scenarios that demonstrate the stress conditions described above. The High Priority Request or 'Hot Job' is not treated here. This is dealt with in the ECS as an ad-hoc production job (see section 3.2.6). If the job exceeds planning thresholds, then the Production Planner may authorize a replan to resynchronize with processing.

6.1.1 Large Scale Reprocessing

6.1.1.1 Reprocessing Stress

This type of event was first outlined in DID 604 2B (604-CD-002-002) as the 'Push Recovery Scenario', and a variation was discussed at IDR (705-CD-005-001, Day 3 LK2) The scenario here has been extended to include a planned reprocessing strategy. In addition the role of resource planning in the planning cycle is shown. A brief outline of the scenario is given in figure 6.1.1.1-1 below.

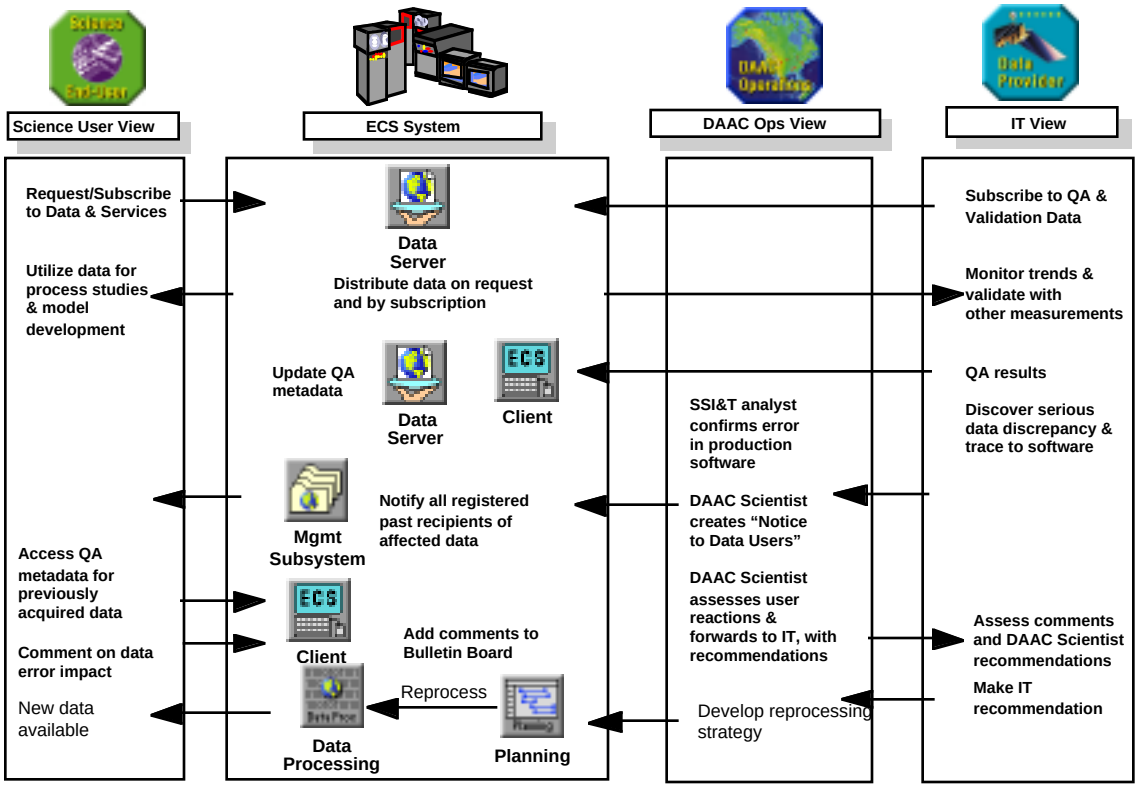

Figure 6.1.1.1-1. Large Scale Reprocessing Scenario

The basic flow is that a fault is discovered in the MODIS L1 processing algorithm that requires extensive reprocessing. MODIS was selected for this scenario because of the heavy dependency on its products at other DAACs. The full scenario includes:

a. development and installation of a corrected algorithm

b. resource planning

c. planning of reprocessing

d. cross-DAAC coordination

6.1.1.2 Push-Side Load Stress

The principle elements under stress in the scenario above are the planning and processing functions (figure 6.1.1.2-1). Processing is under stress because without a coordinated reprocessing plan the queued production requests would exceed the systems capacity. This is because, unlike standard production, all the input data is already available, and so unless plannable controls the flow of reprocessing requests to the production system standard processing could easily get pushed out by reprocessing jobs. The planning system is our primary point of control in this situation by utilizing available resources and coordinating with dependent DAACs to develop and implement a coordinated reprocessing plan.

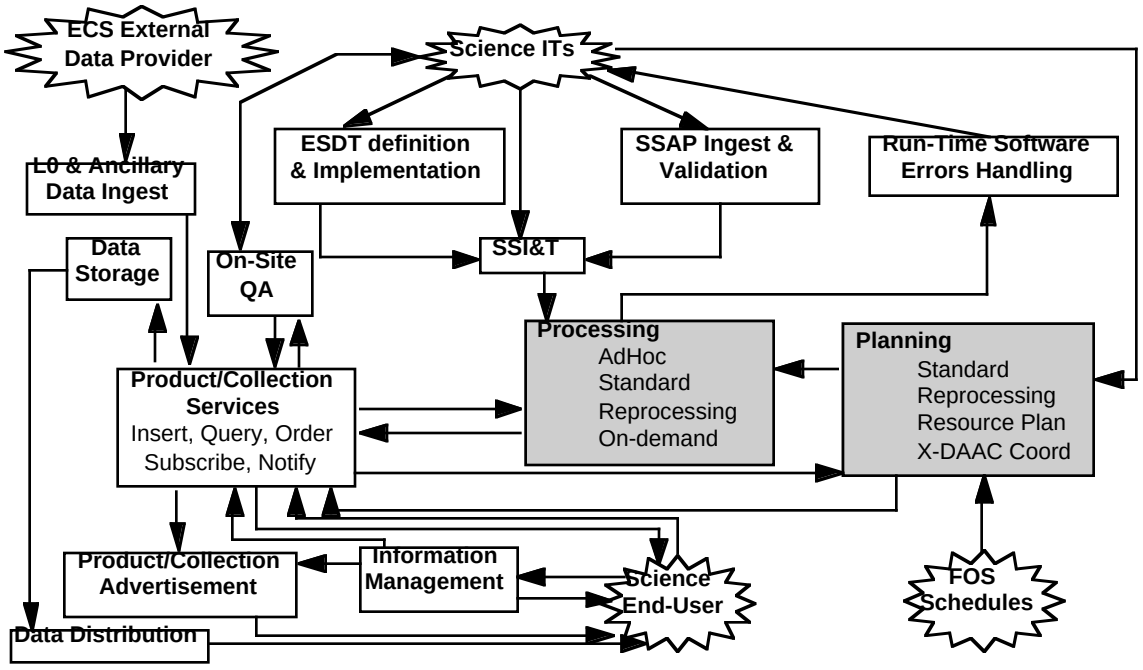

Figure 6.1.1.2-1. Large Scale Reprocessing Stress

The development of a corrected algorithm is performed at the SCF. The installation at the DAAC follows the SSI&T process previously described in section 3.2.5. Resource planning, planning for reprocessing, and cross-DAAC coordination are described in sections 6.2.1 to 6.2.3 below.

6.1.2 Large Pull-Side Loading

The two stress events that have been identified in the pull-side stress were both described at IDR (705-CD-005-001, Day 3, AE2 & MH2). They are also discussed in DID 604 2B (604-CD-002-002) in the 'Network Data Distribution' and 'Pull Recovery' Sections Figure 6.1.2.1-1, 6.1.2.2-1 below outline the two scenarios.

6.1.2.1 Spectacular Event

The 'Spectacular Event' scenario (6.1.2.1) is one that is expected to occur at every DAAC sometime during the lifetime of the mission. The principle stress is seen through the the high number of users attempting to access the system for almost identical data because of a publicly high profile event (a volcano, oil spill, etc.). Because the area of interest is not a standard product, each user will request their own subset of the data. The mitigation strategy has 2 parts:

a. First, restrict the number of users accessing the system by throttling the external session limits. This immediately relieves stress on the system at the expense of the users.

b. Second, create a new special data set that users can access directly and quickly via advertising without having to tie up data server resources. This then gives better access by the users to the desired data.

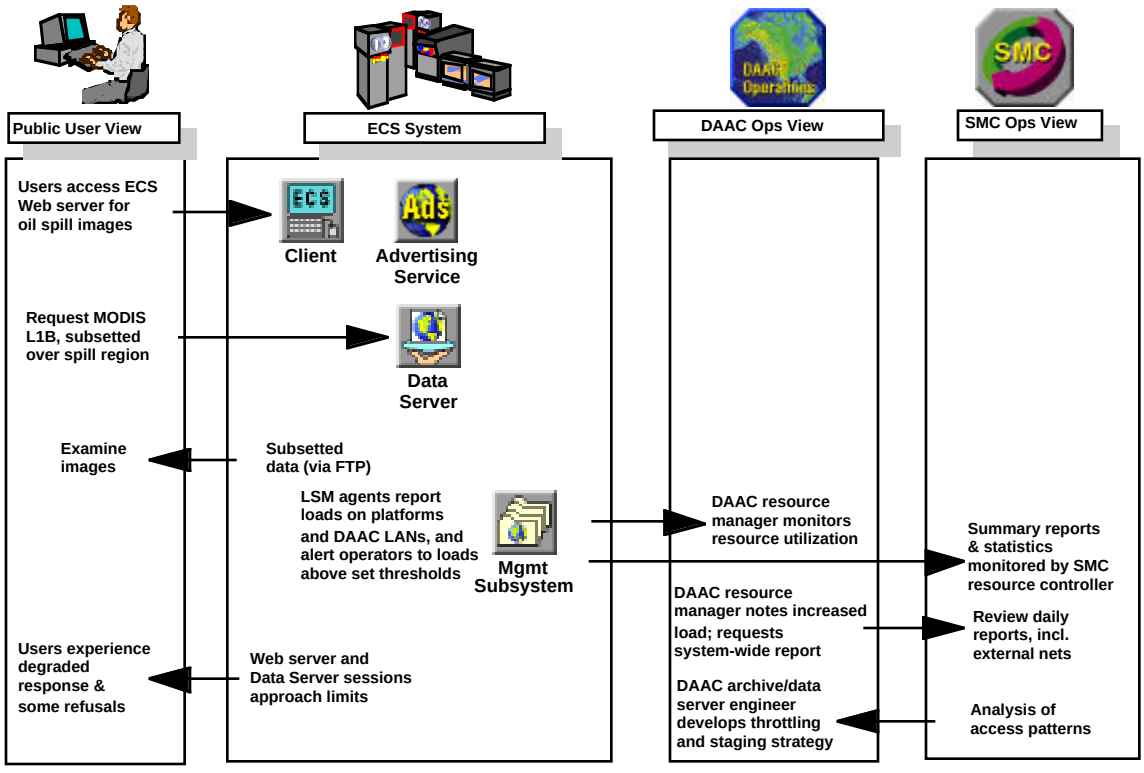

Figure 6.1.2.1-1. Spectacular Event Scenario (1 of 3)

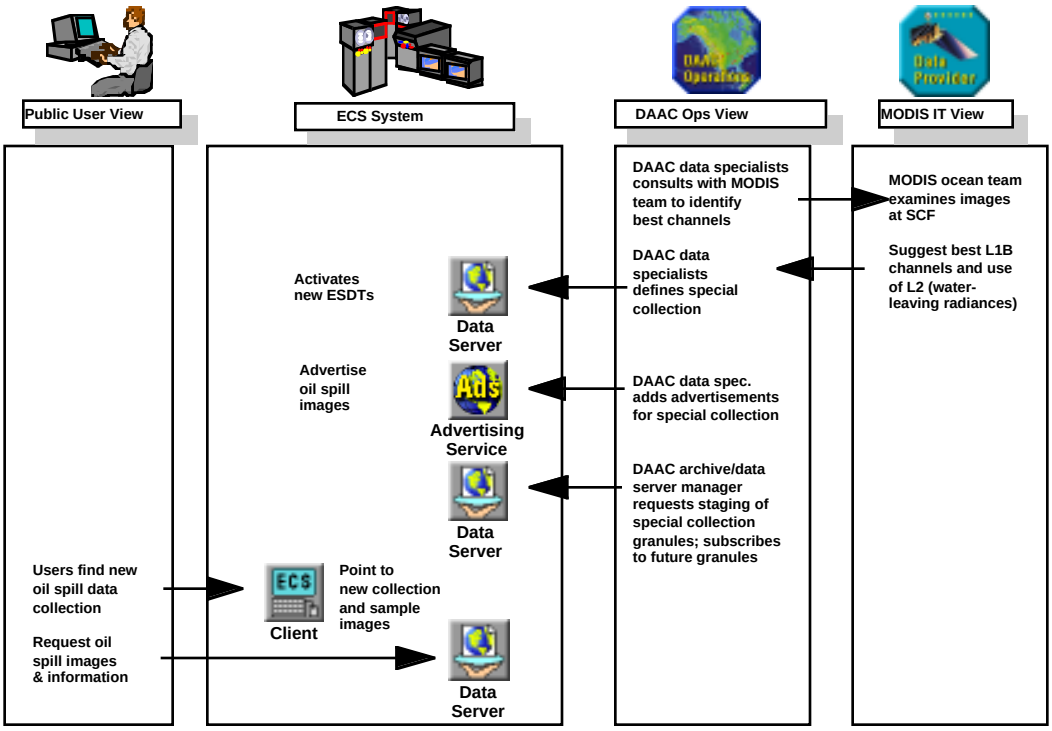

Figure 6.1.2.1-2. Spectacular Event Scenario (2 of 3)

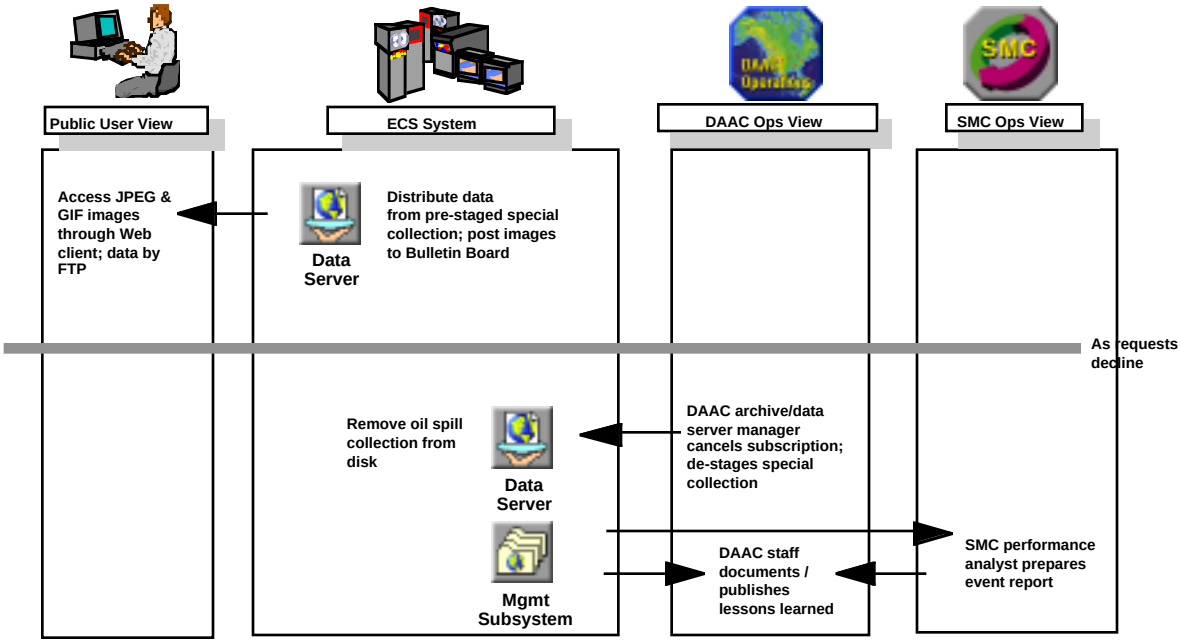

Figure 6.1.2.1-3. Spectacular Event Scenario (3 of 3)

6.1.2.2 Huge Data Request

The 'Huge Data Request' scenario (6.1.2.2) will occur whenever there is a need for massive reanalysis and/or assimilation of data holdings. The scenario is triggered by a request for data that exceeds the working storage capacity of the ECS. The request, therefore, needs to be segmented to be handled in chucks that the system can deal with.

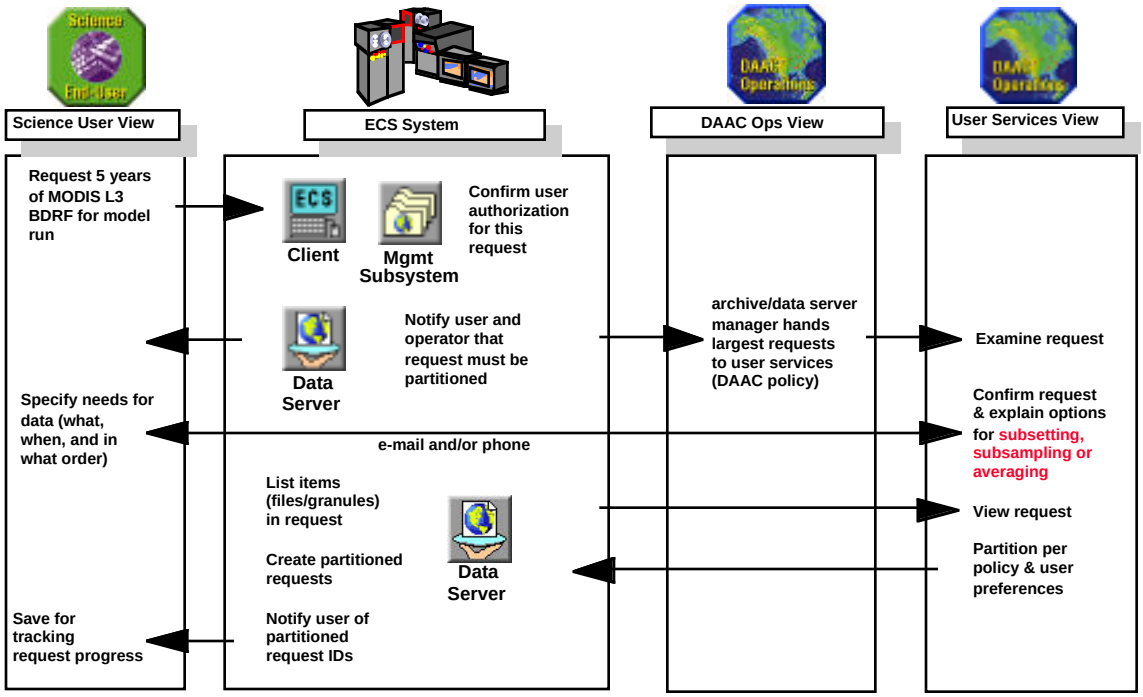

Figure 6.1.2.2-1. Huge Data Request Scenario (1 of 2)

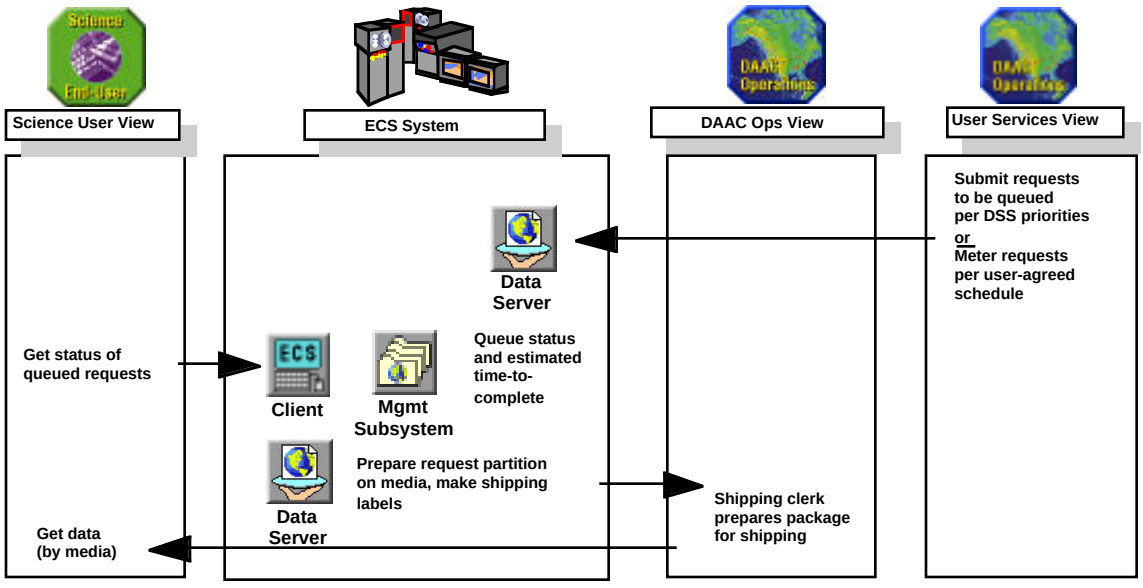

Figure 6.1.2.2-2. Huge Data Request Scenario (2 of 2)

6.1.2.3 Pull-Side Load Stress

The principle elements under stress in the preceding scenarios are the data distribution working storage, and the site session servers (figure 6.1.2.3-1). Data distribution is placed under stress because of the physical limitation upon the working storage. The session servers are stressed because of the capacity of the system to allocate memory and maintain performance with a large number of users.

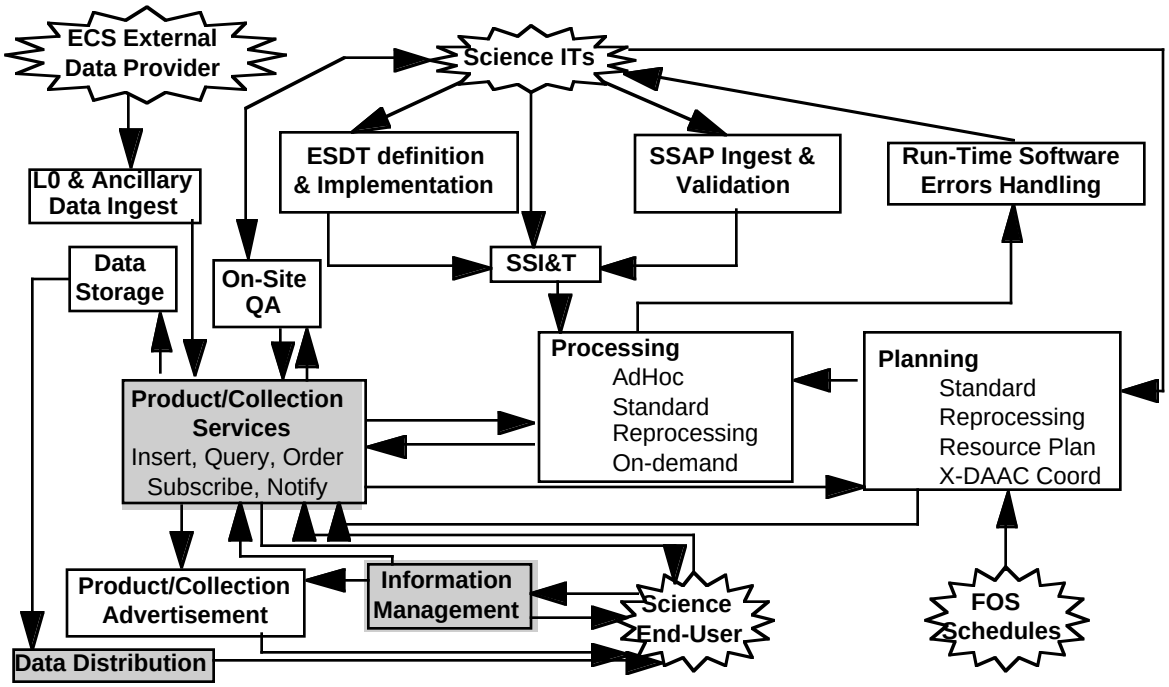

Figure 6.1.2.3-1. Large Pull-Side Load Stress

Two mitigation strategies are discussed in detail in 6.2.4 and 6.2.5 below. The first section describes how we can restrict access to the ECS as an interim measure whilst a more permanent solution (e.g. a new easy access collection) is developed. The second section talks about how the ECS can divide up pull requests into more manageable processable units.

6.2 System Stress Drill Down Scenarios

This section provides 5 detailed scenarios focused on methods to mitigate system stress. The design does not preclude DAACs adopting alternative strategies, and the ideal strategy may depend on a number of competing priorities. The scenarios presented here are, however, realistic, and emphasize all the principle techniques available to DAAC Operations personnel.

6.2.1 Reprocess Planning

As the scientific algorithms mature, it is likely that reprocessing of the earlier observations will be necessary in order to maintain consistency within the long-term data set. The EOS system supports the reprocessing of standard data products, their browse data products and metadata. Reprocessing is driven by a reprocessing request which can be generated in the event of the availability of improved input data, new/improved calibration data, and/or algorithm updates.

Note, however, that production requests may be resubmitted during routine operations for a variety of reasons to "reprocess" individual data input files. These situations are governed by the individual DAAC procedures, and do not require extensive review or impact assessment.

The approval to undertake the reprocessing of a large volume of data involves both operational and scientific issues, especially in cases where interdependencies on products from different instruments are involved. In the case where a reprocessing request involves an entire data set, review and approval may be required from the EOS Program and EOSDIS Project.

Approved reprocessing of data may (depending on their assigned priority) be scheduled to fill slack time slots on computers of similar architectural design during lulls in initial standard processing to insure that optimum utilization is made of available DAAC hardware resources.

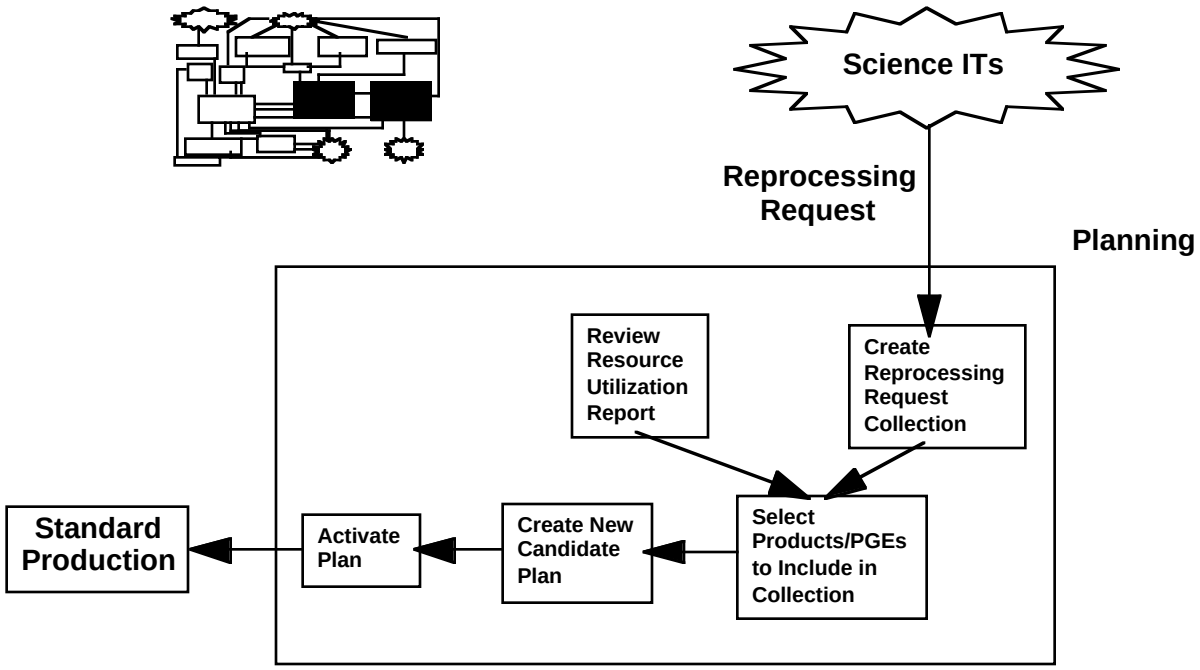

Figure 6.2.1-1. Reprocess Planning Context Diagram

6.2.1.1 Reprocess Planning Description

This scenario depicts how one would assess the impact to a production plan of introducing reprocessing requests. Impact is measured in terms of completion date, resource cost, and data dependencies. Several large reprocessing requests for MODIS data are entered at the Goddard DAAC. The requests are entered a year after launch and require data collected over six months.

The Production Planner groups the requests into a Production Request collection. After generating the collection, a report detailing the resources that would be required for the reprocessing is reviewed and a candidate plan is generated.

Assumptions

- All information concerning the PGEs has already been entered and resides in the PDPS database.
- The PGEs to be reprocessed have undergone SSI&T.
- A resource plan has been generated

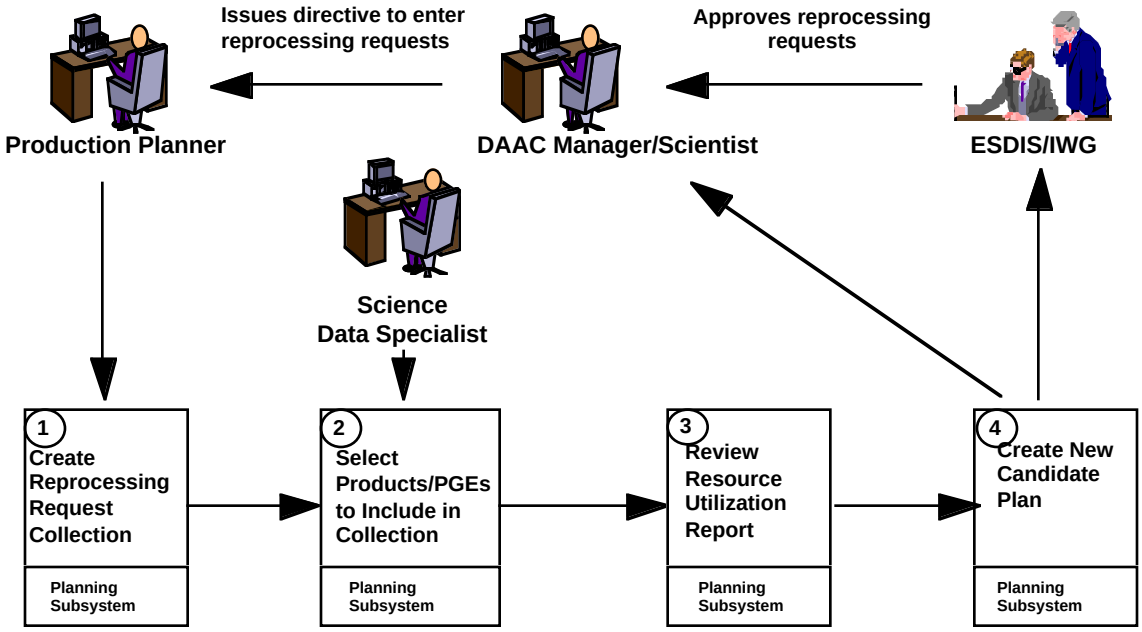

Figure 6.2.1.1-1. Reprocess Planning Functional Flow

6.2.1.2 Reprocess Planning Operator Roles

EDIS/IWG - The reprocessing request is initiated by the instrument team responsible for the algorithm. The requester forwards the reprocessing request to the DAAC. Also, the requester makes the decision to proceed with or to stop the request process based on the estimate and its accompanying information. If the decision is to proceed, the requester forwards the reprocessing request with the impact assessment to the EOSDIS Project Scientist.

DAAC Manager/Scientist - The DAAC operations staff, working with stored accounting information, generate a cost estimate, a potential completion date/time, and a resource impact assessment and returns these to the requester. If the reprocessing request can not be accommodated within existing resource envelopes, the DAAC Manager and EOSDIS project personnel will consider how best to accomplish the reprocessing.

The EOSDIS Project Scientist grants or denies approval based on science considerations, the allocations available for either the requester or the allocations for the topic covered by the request.

Science Data Specialist answers detailed questions concerning the structure and interdependencies of the discipline data and PGEs stored at their DAAC, and provides an interface between the users and the EOS for more specific inquiries.

Production Planner - Perform generation of system production schedules and coordinates user requests.

6.2.1.3 Reprocess Planning Points of View

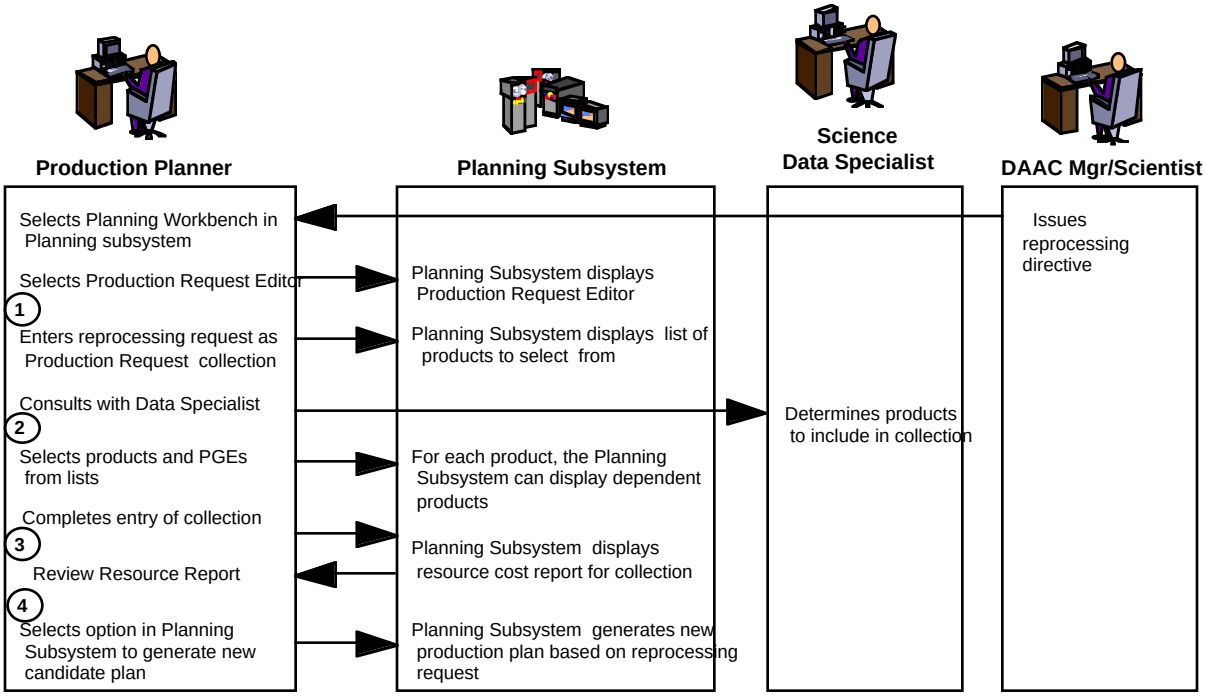

Figure 6.2.1.3-1. Reprocess Planning Point of View

6.2.1.4 Work Flow for Reprocess Planning

The purpose of this workflow is to show how a new Candidate Plan is created for Reprocessing using the Planning Workbench. The Production Planner selects the Request Editor and inputs the Request type with or without a completion date. The workflow is separated into two paths, either a single or multiple production event.

For a single production event, the data is entered, and the Planner reviews the Resource Utilization Report and creates a Candidate Plan. This is covered in Routine Planning.

For multiple production events, the necessary data is entered, instruments selected (optional), and the Production Planner may view product dependencies and select products. The Production Planner will then select PGE parameters. The Production Planner may repeat the process as required for multiple PGEs. The Production Planner reviews the Resource Utilization Report and creates a Candidate Plan.

This section is continued on the next page.

Workflow

Figure 6.2.1.4-1. Enter Reprocess Request Workflow

Data Activity

Table 6.2.1.4-1. Data Activity for Enter Reprocess Request

Object Name	Data Element	Activity																				
		1	2	3	4	5.1	5.2	6.1	6.2	7.1	7.2	8	9.1	9.2	9.3	10.1	10.2	11	12	13	14	15
PlPRCollection & PlProductionRequest	Start Date/Time							I	I													
	Stop Date/Time							I	I													
	Originator							E	E													
	Origination Date							E	E													
	Priority							I	I													
PlProductionRequest	Production Target Date				I																	
	Comment								I													
	Production Request ID								I										I			
	PGE ID								E									E				
PlProductionRequestUI	Product list															I	I					
	Product Type								D				D	D								
	User Type								D													
	Instrument Name								D										E			
	Platform Name								D										E			
	PGE Parameters								D													
	Resource Utilization Report																				D	
PlPRCollection	Collection ID							I														

6.2.2 Resource Planning

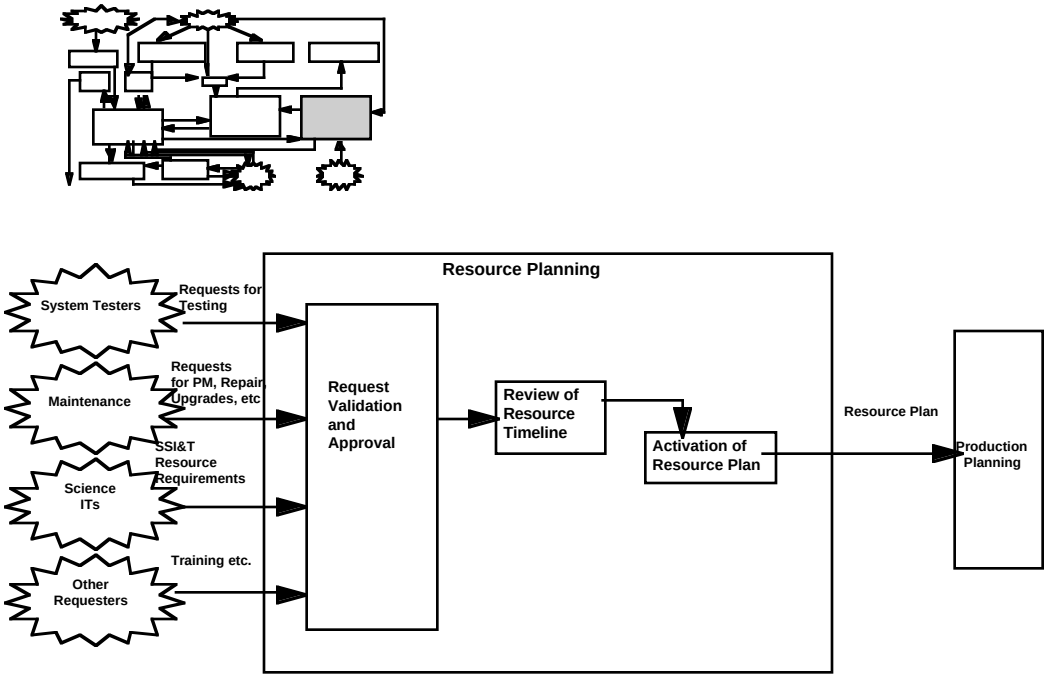

Figure 6.2.2-1. Resource Planning Context Diagram

The planning of ground events on resources within a DAAC are carried out by the site Resource Planner using the Planning Workbench utility within the Planning Subsystem. This utility allows the planner to schedule predictable ground events and science data processing against ECS resources.

At PDPS database initialization, the MSS Resource Configuration Information is used to identify the current resources available. Resources are defined for the whole DAAC and include computers, disks, and networks. The Planning Workbench builds resource lists from these defined resources. This configuration information can then be updated by an operator whenever there is a change.

Once these resources are identified, the Resource Planner at each site receives requests for site resources that need to be scheduled. These events may consist of science data processing and distribution, testing, simulations, preventative maintenance or upgrades, or any other event that require resources. These events are entered with an activity description, resource requirements, time requested (acceptable variances may be specified in comments field), and a duration into the PDPS database through the Planning Workbench GUI.

All resource requests must be validated and approved before scheduling. Validation is the process whereby a request is checked for completeness, and it's purpose is deemed reasonable. The Production Planner after reviewing a resource request may choose to consult with appropriate DAAC staff or assign a staff member to validate a request. Approval occurs after a request has been validated and the event time is acceptable. Resource plans are created using approved

resource requests. The resource plan is published to the Data Server for review by interested parties. This plan is passed to the Production Planning subsystem and is used for scheduling production.

Resource planning can take place whenever a production plan needs to be created. In general, this will occur on a biweekly basis for 30 day plans, on a weekly basis for 10 day plans, and on a daily basis. Ground events can be entered at any time however, and a replan may be done whenever it is necessary. Resource plans can be published to the Data Server for review by parties outside the DAAC in the same way that production plans are.

6.2.2.1 Scenario Description

This scenario illustrates an end-to-end flow for resource planning. The scenario details all activities from a request for resources, to the generation and publication of a resource plan. However the new resource plan causes problems for the Production Planner who has a large reprocessing job due. The Production Planner asks if the new ground event can be rescheduled to accommodate the reprocessing. The requester is contacted and the event is rescheduled to everyone's satisfaction and a new resource plan is generated and published. Figure 6.2.2.1-1 provides a functional flow of this scenario.

Assumptions

- The resource requester has access to the Planning Workbench.
- The new ground event is validated and approved.
- The time of the ground event execution is flexible.
- It is possible to satisfy all parties.

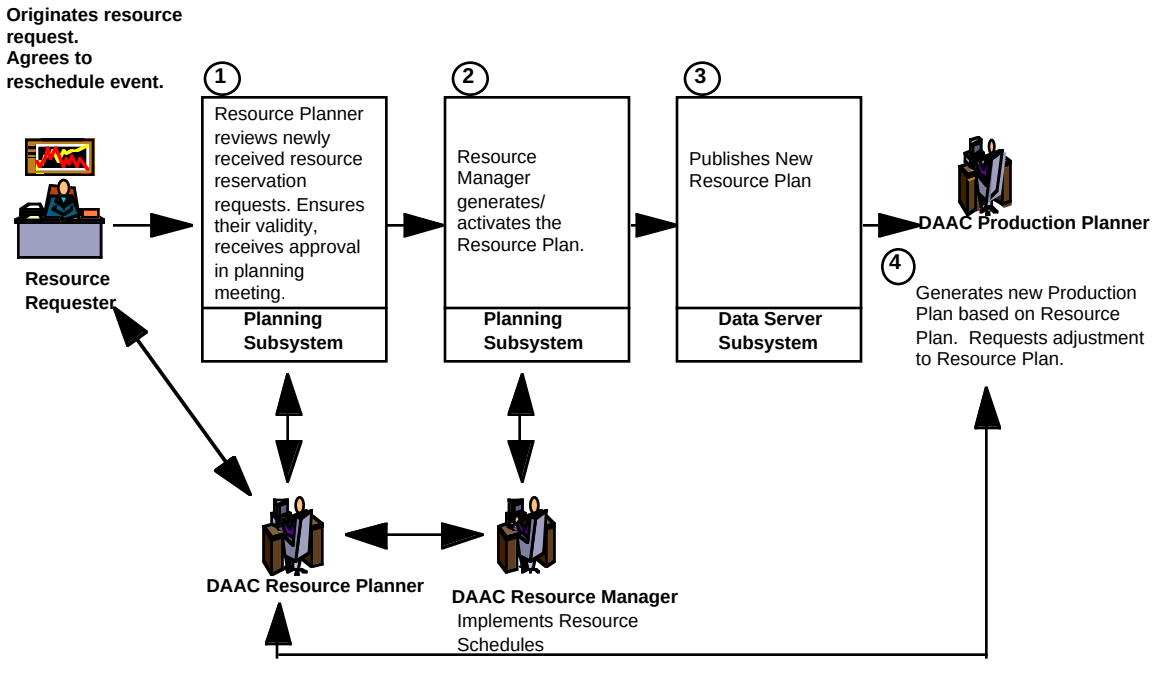

Figure 6.2.2.1-1. Resource Planning Functional Flow

6.2.2.2 Operator Roles

Resource Planner - Plans and allocates resources to services and activities within the DAAC on a routine basis. The Resource Planner will develop, review the current status of, or update resource plans daily. During transition periods when significant hardware or software upgrades are being installed and tested, resource planning may be more involved and more coordination may be required between DAAC staff.

Production Planner - Will generate system production schedules using resource plans.

Resource Manager - Implements the resource schedule in operations. Controls operational resources and may deviate from schedule in response to anomalies.

6.2.2.3 Detailed Points of View

The following provides and overview of Resource Planning and identifies activities taking place in the Planning subsystem as well as activities performed by the Resource Planner, Resource Manager, and Production Planner.

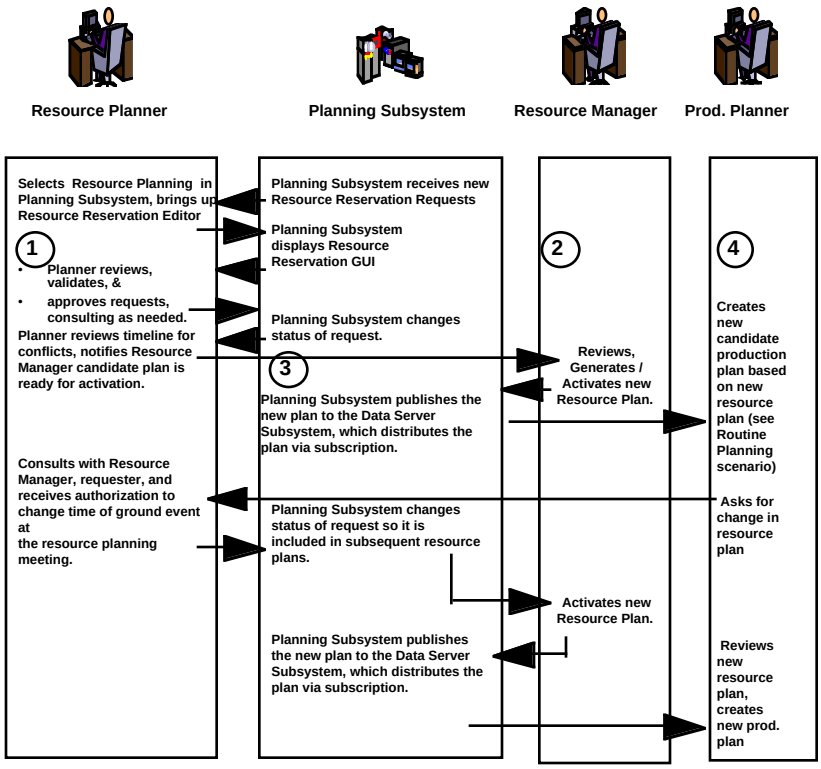

Figure 6.2.2.3-1. Resource Planning Points of View

This section is continued on the next page.

6.2.2.4 Enter Resource Reservation Workflow

Role: Resource Requester

Requester starts up the Planning Workbench, selects the Resource Reservation Editor option and originates a request for resources.

Workflow

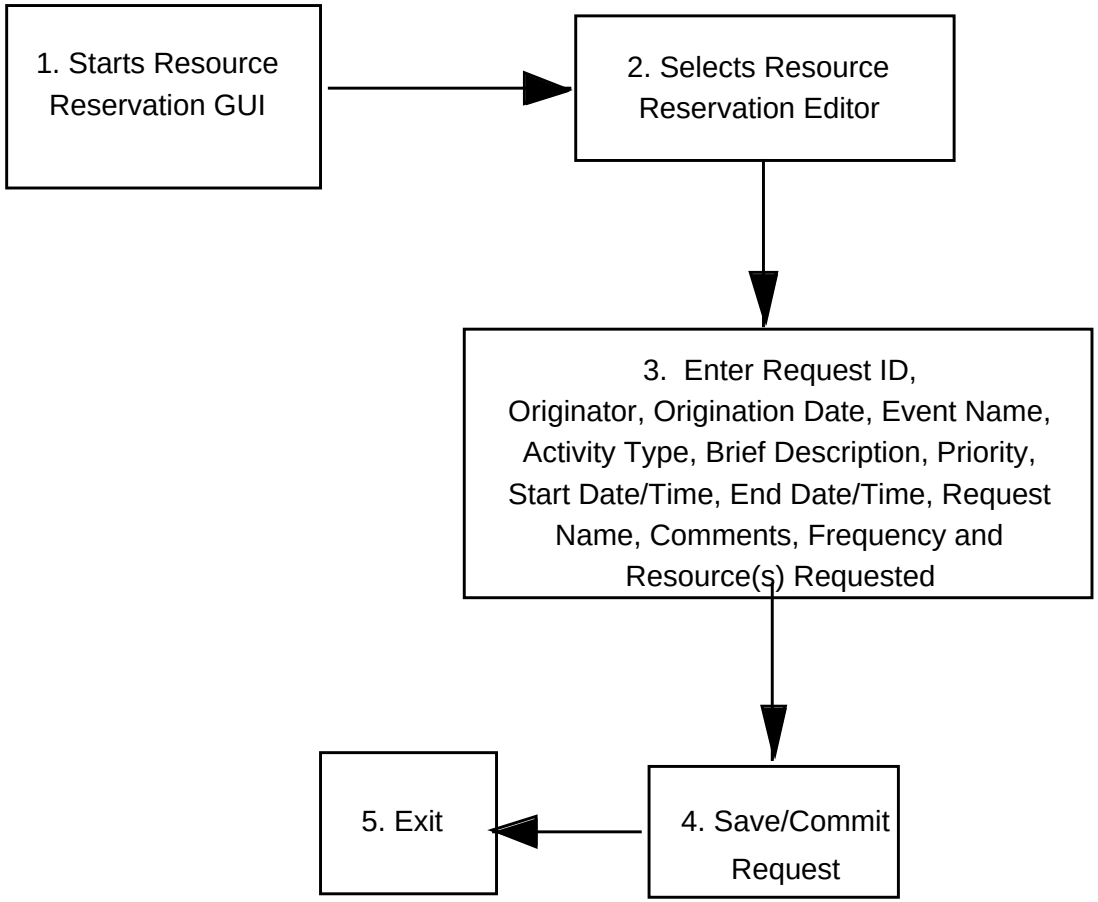

Figure 6.2.2.4-1. Enter Resource Reservation Workflow

Data Activity Table

Table 6.2.2.4-1. Data Activity for Enter Resource Reservation

Object Name	Data Element	Activity				
		1	2	3	4	5
PIRpResourceReservation	Originator		D			
	Event Name			I		
	Activity Type			I		
	Brief Description			I		
	Priority			I		
	Start Date/Time			I		
	End Date/Time			I		
PIRpComplexResourceReservation	Frequency			I		

6.2.2.5 View/Edit/Validate/Approve Resource Reservation

Role: Resource Planner

The Resource planner selects the Resource Reservation Editor to review, validate (may require notification to sponsor who actually validates) and approve new resource requests.

Workflow

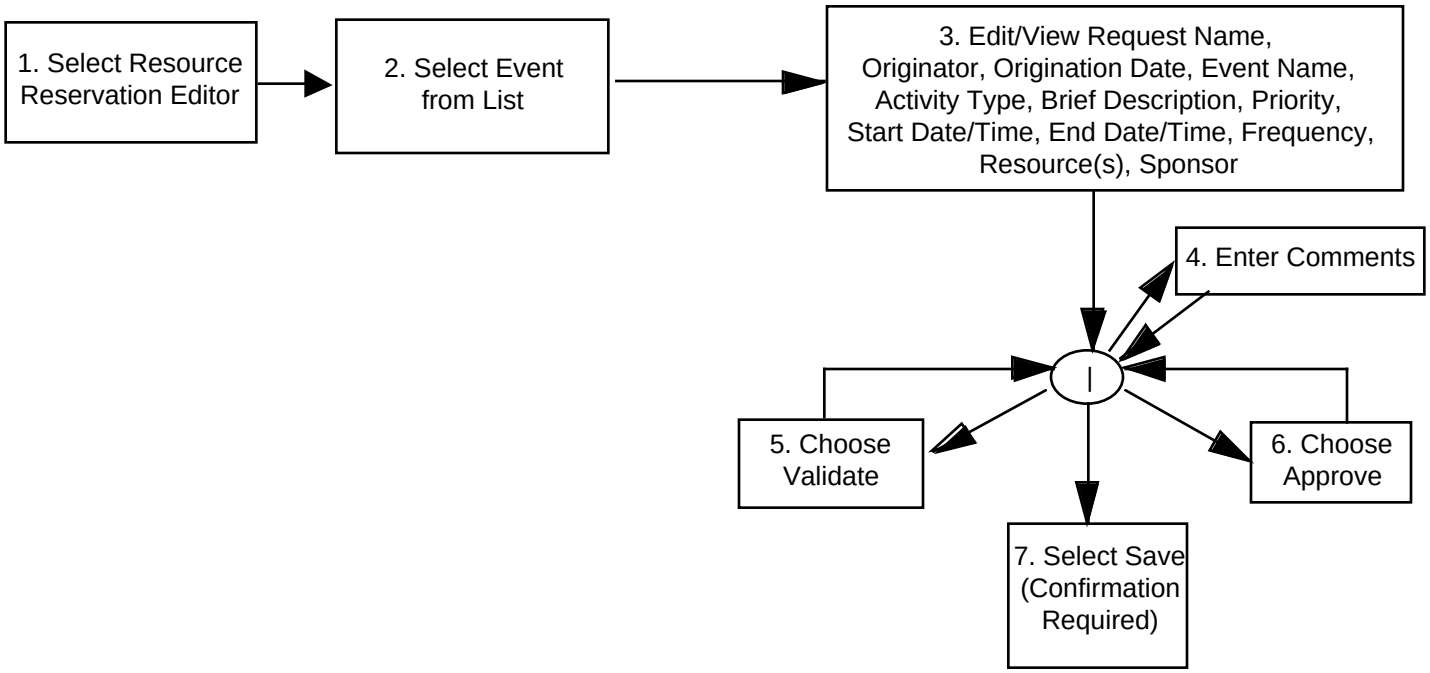

Figure 6.2.2.5-1. View/Edit/Validate/Approve Resource Reservation Workflow

Data Activity Table

Table 6.2.2.5-1. Data Activity for View/Edit/Validate/Approve Resource Reservation

Object Name	Data Element	Activity						
		1	2	3	4	5	6	7
PIRpResourceReservation	Approval			I				
	Validation			I				

6.2.2.6 View Resource Timeline/Publish Resource Plan

Role: Resource Manager

The Resource Manager selects the Resource Reservation Editor in order to review and activate/publish a resource plan.

Workflow

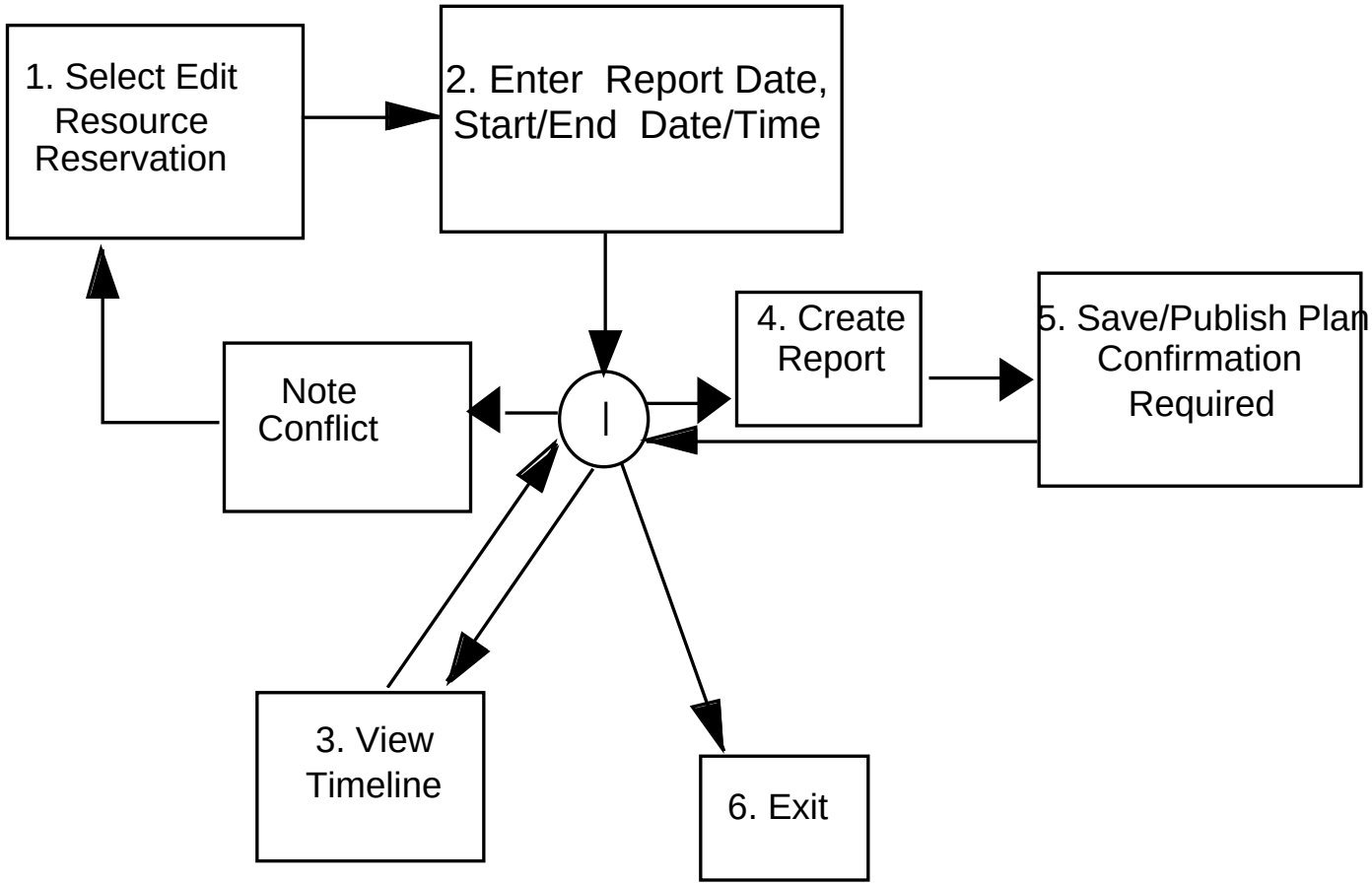

Figure 6.2.2.6-1. View Resource Timeline/Publish Resource Plan Workflow

Data Activity Table

Table 6.2.2.6-1. Data Activity for View Resource Timeline/Publish Resource Plan

Object Name	Data Element	Activity					
		1	2	3	4	5	6
PIRpResourceState	Start Date/Time		I				
	End Date/Time		I				

6.2.3 Cross DAAC Plan Coordination

This function of this drill down scenario is to show what a DAAC would do for cross-DAAC planning that will minimize the impacts of replanning on a remote DAAC. The Scenario Context Diagram Figure 6.2.3 shows the steps that would be involved in this scenario.

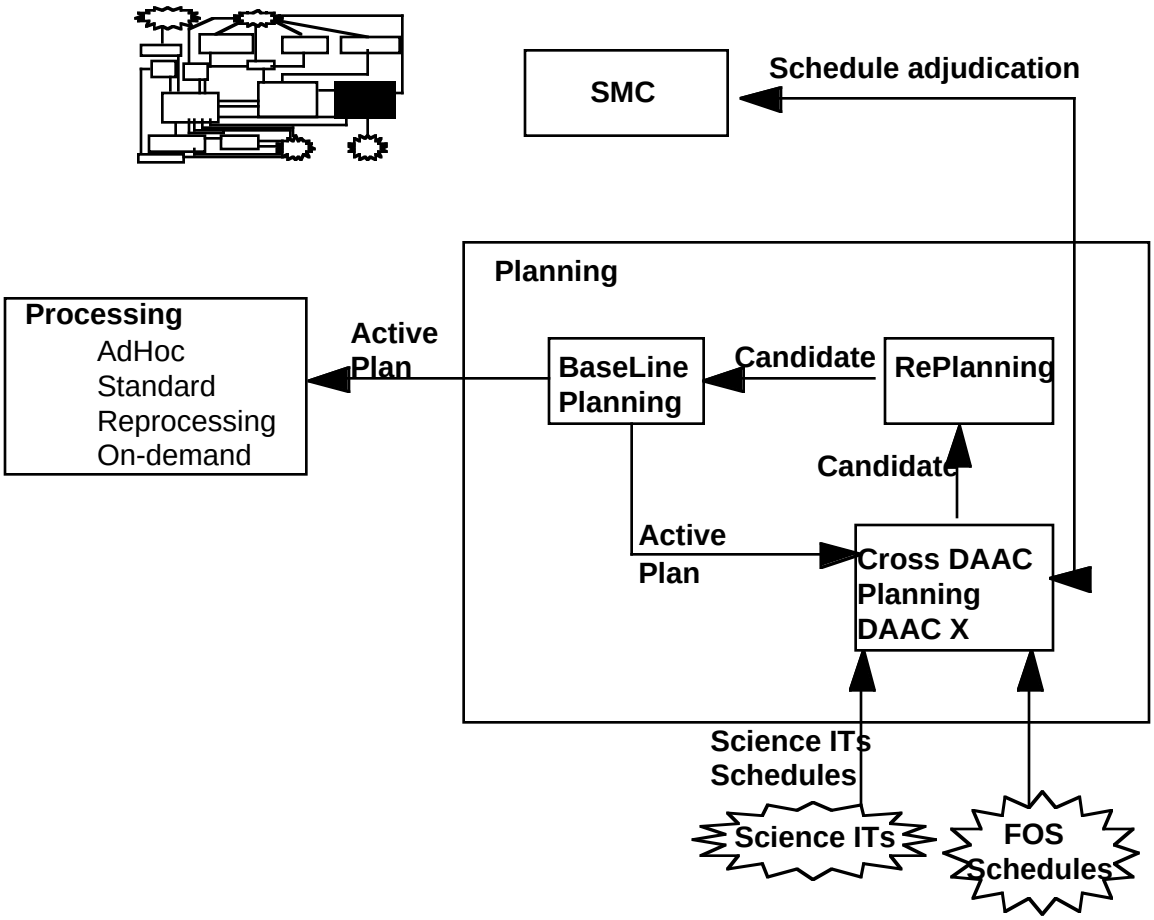

Figure 6.2.3-1. Cross-DAAC Plan Coordination Context Diagram

6.2.3.1 Description

This scenario describes the steps an operator would take when doing cross-DAAC planning that will minimize the impacts of replanning on a remote DAAC. A large scale reprocessing request for MODIS data has caused Goddard DAAC to replan. This new request will impact EDC, LaRC, and NSIDC. The DAAC operator calls these DAACs and begins to work out a plan that is satisfactory to all affected DAACs. Once a plan has been agreed upon, it is baselined. Any future replans then are checked against this baseline to ensure that all data required at the remote DAACs is produced by the agreed upon times. The assumptions are that the Production Request have already been entered into the PDPS Database and Ground Events that need planning around have been scheduled using the Resource Planning UI. The scenario breaks out has follows:

The DAAC Production Planner works with the remote DAACs to establish a baseline plan. A production request producing a data type needed at the remote DAAC is added to a Production Plan. The DAAC Production Planner is notified that an inter-DAAC dependency is being added to the plan. The DAAC Production Planner at the DAACs involved, work to create a plan that will meet all DAACs requirements. The SMC (SMC Resource Controller) may become involved to adjudicate any conflicts with the plans. After this is complete the DAAC Production Planner will establish this plan as the baseline for the DAAC. Once the baseline has been complete, any replans done at the local DAAC are compared with the baseline. The DAAC decides to do a replan due to the creation of a new resource plan, the DAAC Production Planner is notified if the new plan will produce the needed data for the remote DAAC later than the original time baselined. At this point, the DAAC Production Planner can either; increase priority of the production request that produces the data needed at the remote DAAC or call the remote DAAC and try to come up with a new baseline.

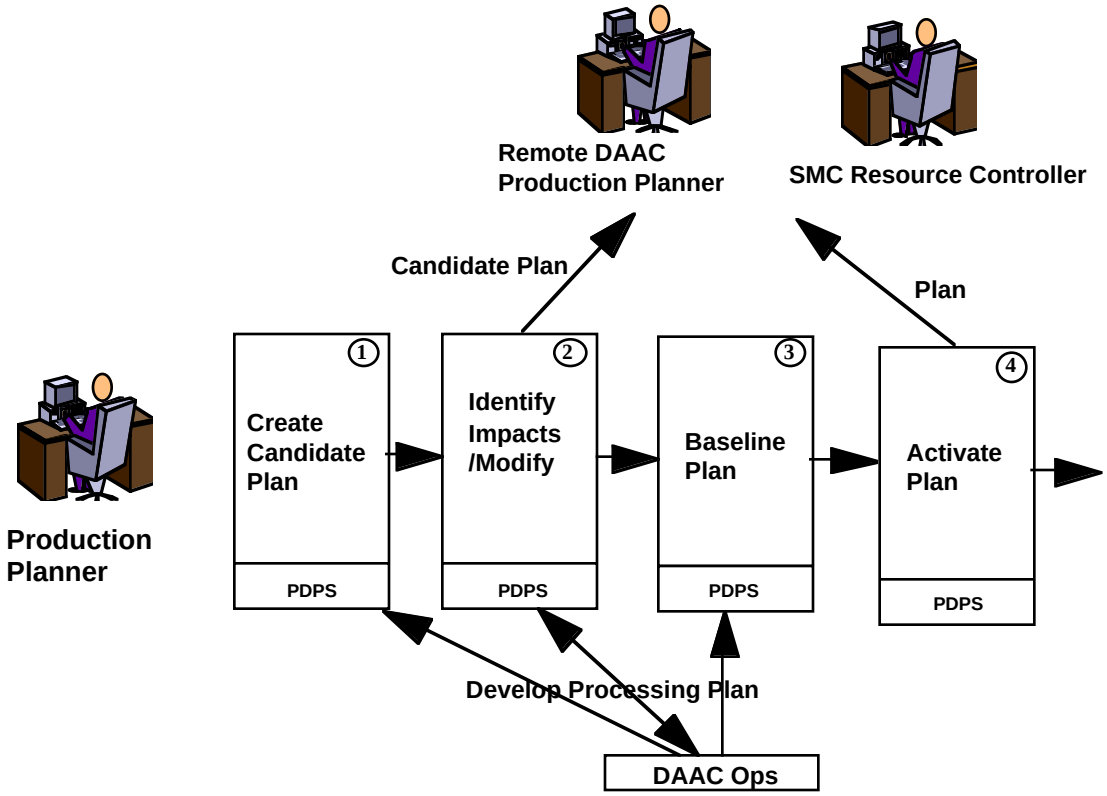

Figure 6.2.3.1-1. Cross-DAAC Plan Coordination Functional Flow - Establish Baseline

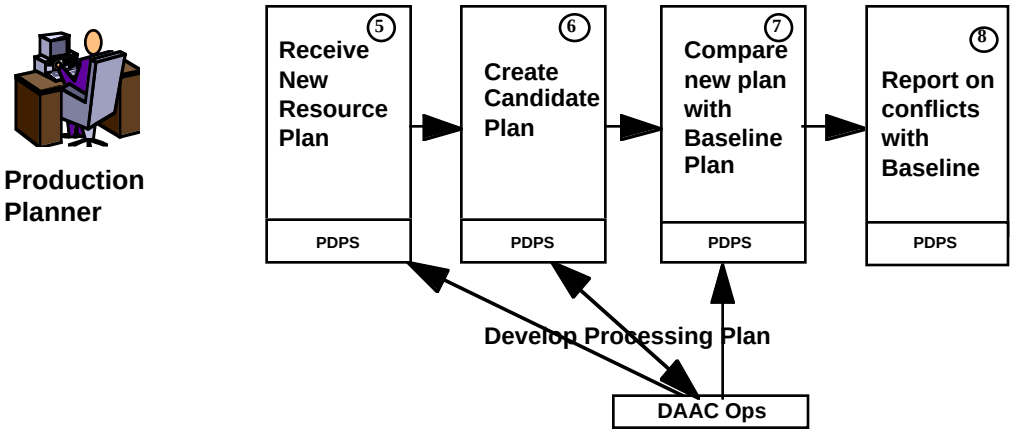

Figure 6.2.3.1-2. Cross-DAAC Plan Coordination Functional Flow - Replan

6.2.3.2 Operator Roles

DAAC Production Planner - Performs generation of system production schedules, and coordinate user request.

SMC Resource Controller - Support and maintain the high-level ground event schedule for all ECS services; coordinate inter-DAAC product generation dependencies and monitor all schedules for compliance.

6.2.3.3 Detailed Points of View

Detail PoV Chart stepping through all the scenario and showing all relevant roles interact.

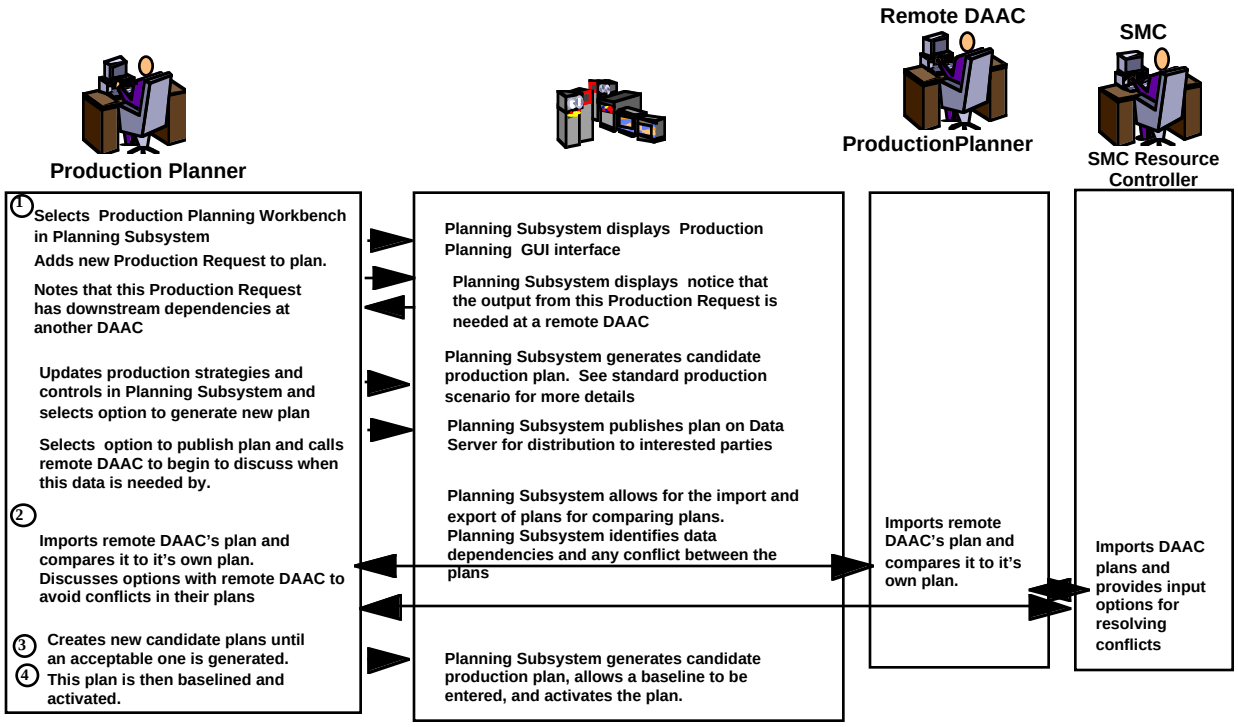

Figure 6.2.3.3-1. Cross-DAAC Plan Coordination Points of View

6.2.3.4 Baseline Workflow

Figure 6.2.3.4-1 shows the steps taken to establish a baseline. Table 6.2.3.4-1 shows the data activities associated with this workflow.

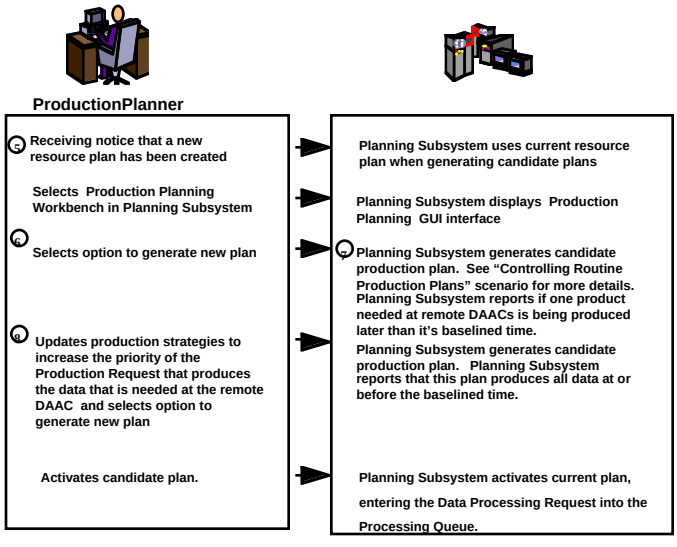

Figure 6.2.3.3-2. Cross-DAAC Plan Coordination Points of View (2 of 2)

Workflow

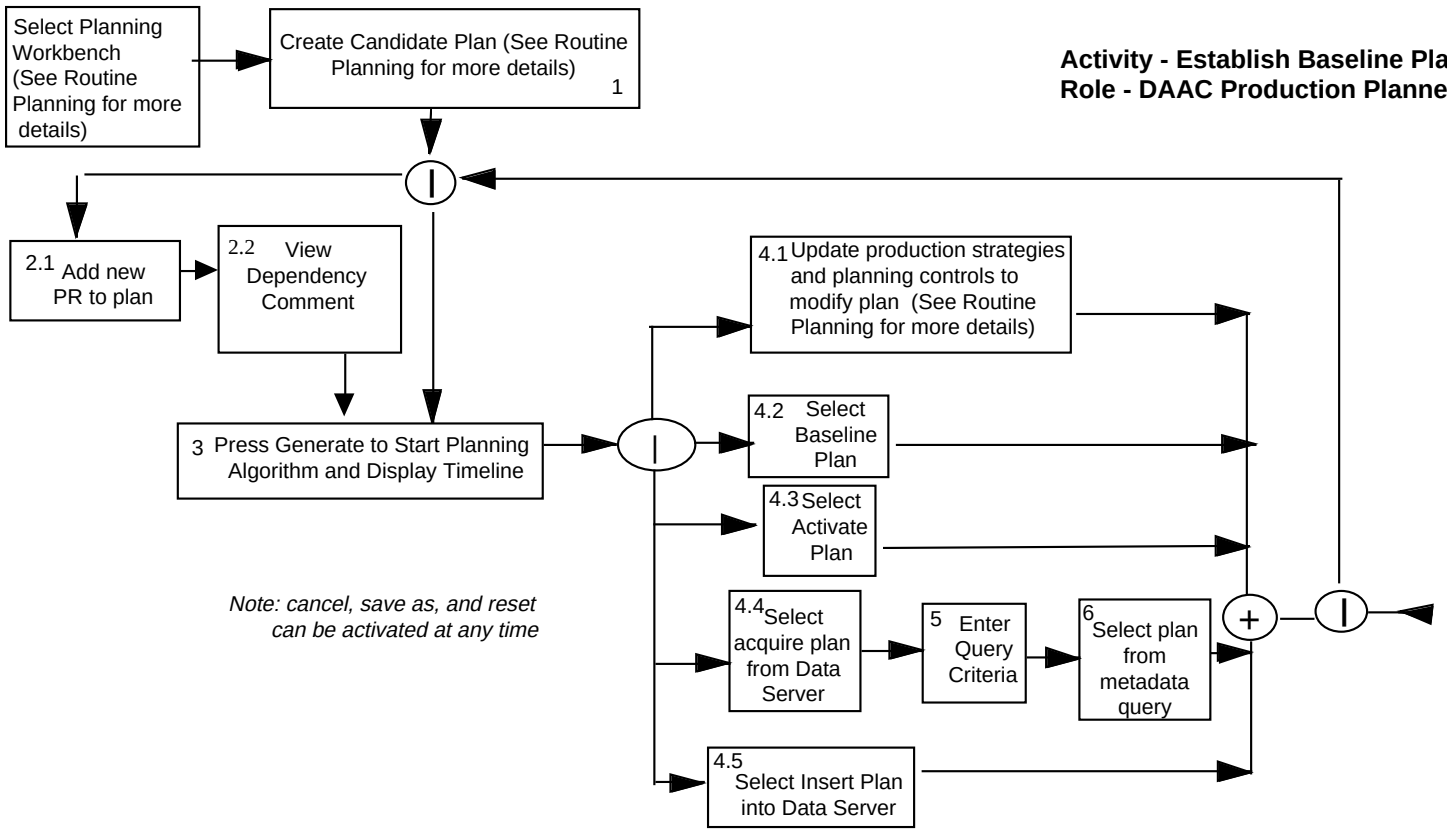

Figure 6.2.3.4-1 Establish Baseline Workflow

Data Activity

Table 6.2.3.4-1 Data Activity for Establish Baseline

Object Name	Data Element				Activity							
		1	2.1	2.2	3	4.1	4.2	4.3	4.4	4.5	5	6
PlPlanB	StartTime	I										
	EndTime	I										
	Description	I										
	Status											
	(Candidate/											
	Active)	D										
	PlanName	I										
	ProdReqList	I										
	Production Plan											
	Name		E									
	Generate Plan				I							
PlProdStratNB	ProdStrategy	I										
	PGEWeight					I						
	UserWeight					I						
	PRTypeWeight					I						
PlProduction	Production											
RequestB	Request		D									
	Priorty		D									
	Start Date/Time		D									
	End Date/Time		D									
	Comment		D									
PlPGE	PGE		D									
PlActivePlan	StartTime							I				
	EndTime							I				
PlPlanMetadata												
File	List of Data Sets								D		I	D
	Decription								D		I	D
	Forecast								D		I	D
	End Day								D		I	D
	Start Time								D		I	D
	DAAC								D		I	D
PlPlanning												
Workbench	Baseline						I					
	Activate							I				
	Acquire Plan								I			
	Publish									I		
	Plan Selected											I
PlDataType	myName			D								
	myUsedByCenter			D								

6.2.3.5 Replan Workflow

Figure 6.2.3.5-1 shows the steps taken to replan. Table 6.2.3.5-1 shows the data activities associated with this workflow.

Workflow

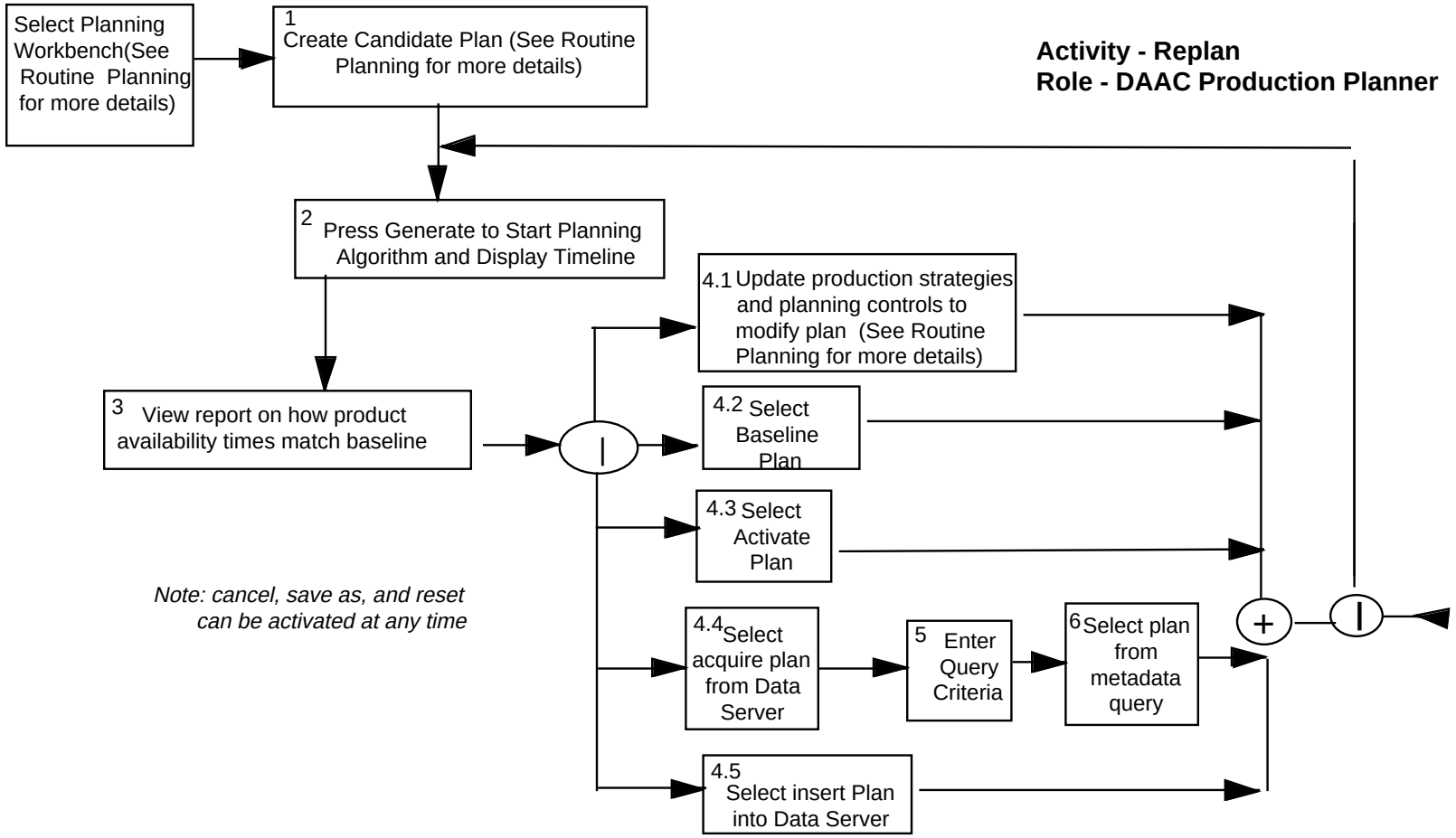

Figure 6.2.3.5-1. Replan Workflow

Table 6.2.3.5-1. Data Activity for Replan

Object Name	Data Element	Activity									
		1	2	3	4.1	4.2	4.3	4.4	4.5	5	6
PlPlanB	StartTime	I									
	EndTime	I									
	Description	I									
	Status (Candidate/ Active)	D									
	PlanName	I									
	ProdReqList	I									
	Generate Plan		I								
PlProdStratNB	ProdStrategy	I									
	PGEWeight				I						
	UserWeight				I						
	PRTypeWeight				I						
PlPGE	PGE										
PlActivePlan	StartTime						I				
	EndTime						I				
PlPlanMetadata File	List of Data Sets							D		I	D
	Decription							D		I	D
	Forecast							D		I	D
	End Day							D		I	D
	Start Time							D		I	D
	DAAC							D		I	D
PlPlanning Workbench	Baseline					I					
	Activate						I				
	Acqurie Plan							I			
	Publish								I		
	Plan Selected										I
PlDataGranule	myBaselineTime			D							
PlActivity	myEndTime			D							

6.2.4 Data Management Server Saturation

Situations of unusually high ECS demand may occur, where the normally available processing resources may be overloaded. This may be inspired by a catastrophic event, where a large number of users might initiate broad-based queries across multiple sites to capture as much observed data as possible. The ECS must attempt to process this barrage of requests in addition to its normal workload.

Aside from the load incurred by the query and subsequent data inventory list traffic within the system, the nature of the queries themselves may pose significant processing overhead. It can be expected that a number of wild card cross-DAAC searches will be requested. Additionally, coincident searches may be initiated, where qualifying data inventory lists consist of representative observations at the same time and date (e.g. search for all instrument data sets at 5/18/81 @ 3 PM EST of Mt. St. Helens).

The current solution that ECS operators have involves restricting number of concurrent access to the Web server, which would limit the number of users accessing the systems.

The Resource Manager will restrict access to the Data Management Server (Web access) in order to reduce the load. Figure 6.2.4-1 displays the context of the scenario as how it relates to the entire Science Operations Environment.

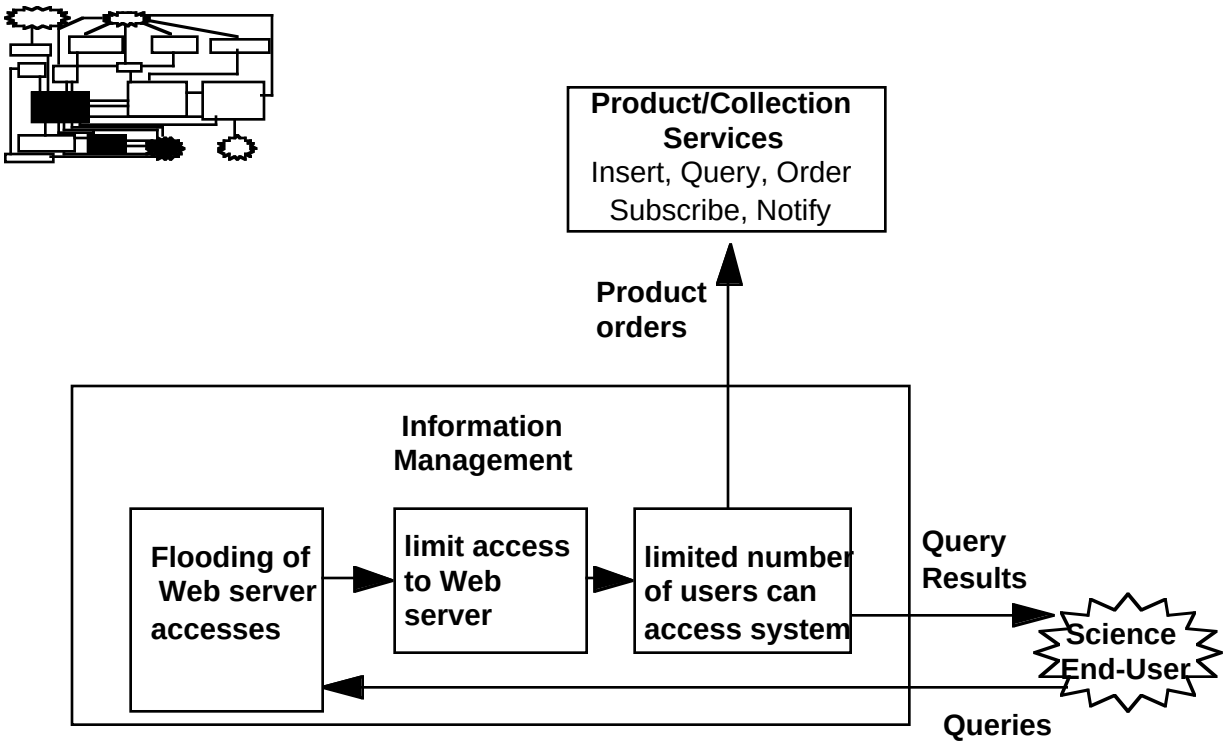

Figure 6.2.4-1. Data Management Server Saturation Context Diagram

6.2.4.1 Description of the Data Management Server Saturation Scenario

The scenario assumes a catastrophic event, with the subsequent dramatic increase in the number of users attempting to access the system and submit queries. The scenario is not an attempt to describe a system-wide response to a flood of requests. It rather focuses on responses which can applied to Web servers and at ECS databases which are logically equivalent but physically distributed at the different DAACs. The Advertising Subsystem database and the Data Management Subsystem unified database fall in this latter category. The scenario also assumes Web server capabilities which are common today. It does not assume the capabilities of any specific COTS Web server, nor does it attempt to predict Web server capabilities which may be available in the Release B time frame. Given the pace of technology change for Web servers, it is virtually certain that additional strategies and server features will be available to deal with Web server saturation in the future.

The scenario starts with the Resource Manager noticing flooding in the Web server. This flooding then results in degraded response times. The Resource Manager then invokes the server maintenance tool and limits sessions on the server.

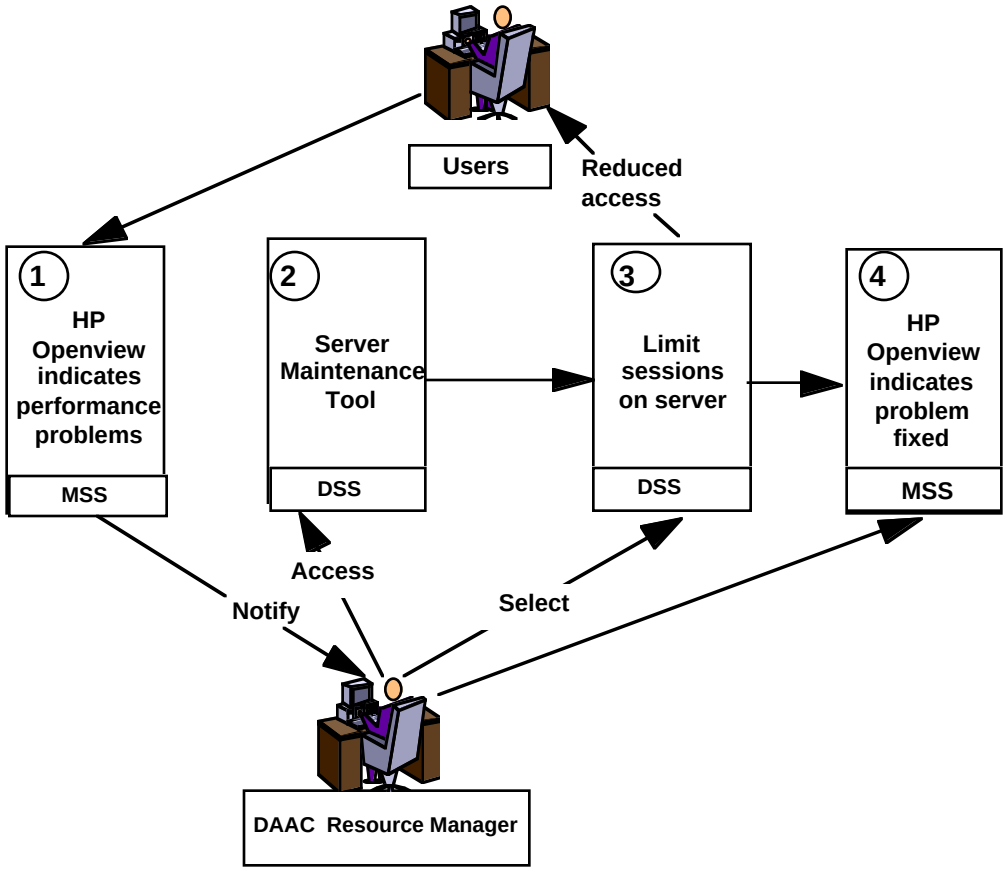

Figure 6.2.4.1-1. Data Management Server Saturation Functional Flow Diagram

6.2.4.2 Operator Roles

DAAC Resource Manager - Detects large number of users accessing the data server. Detects degraded performance. Limits the number of sessions on the server.

6.2.4.3 Detailed Points of View

This Point of View depicts how a Resource Manager would relieve overloading of the system by restricting the access to the data server.

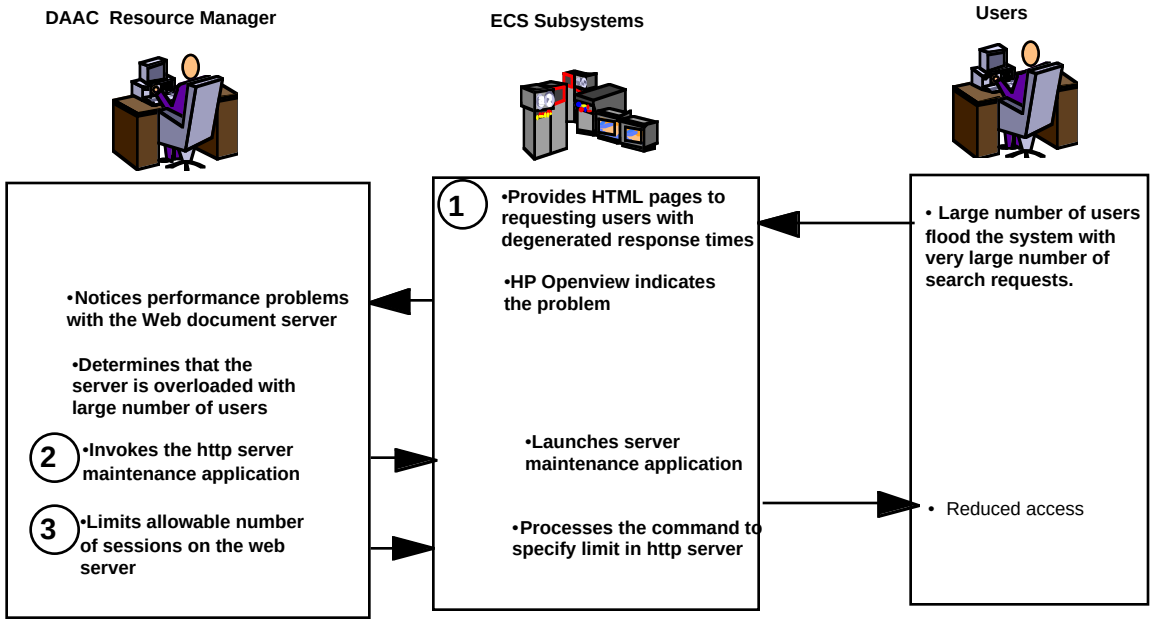

Figure 6.2.4.3-1. Data Management Server Saturation Points of View Diagram

This section is continued on the next page.

6.2.4.4 Server Saturation Resolution Workflow

The purpose of this workflow is to depict the actions that a Resource Manager can take to reduce the load on the data server. In this case the Manager chooses to restrict the number of users on the data server.

Workflow

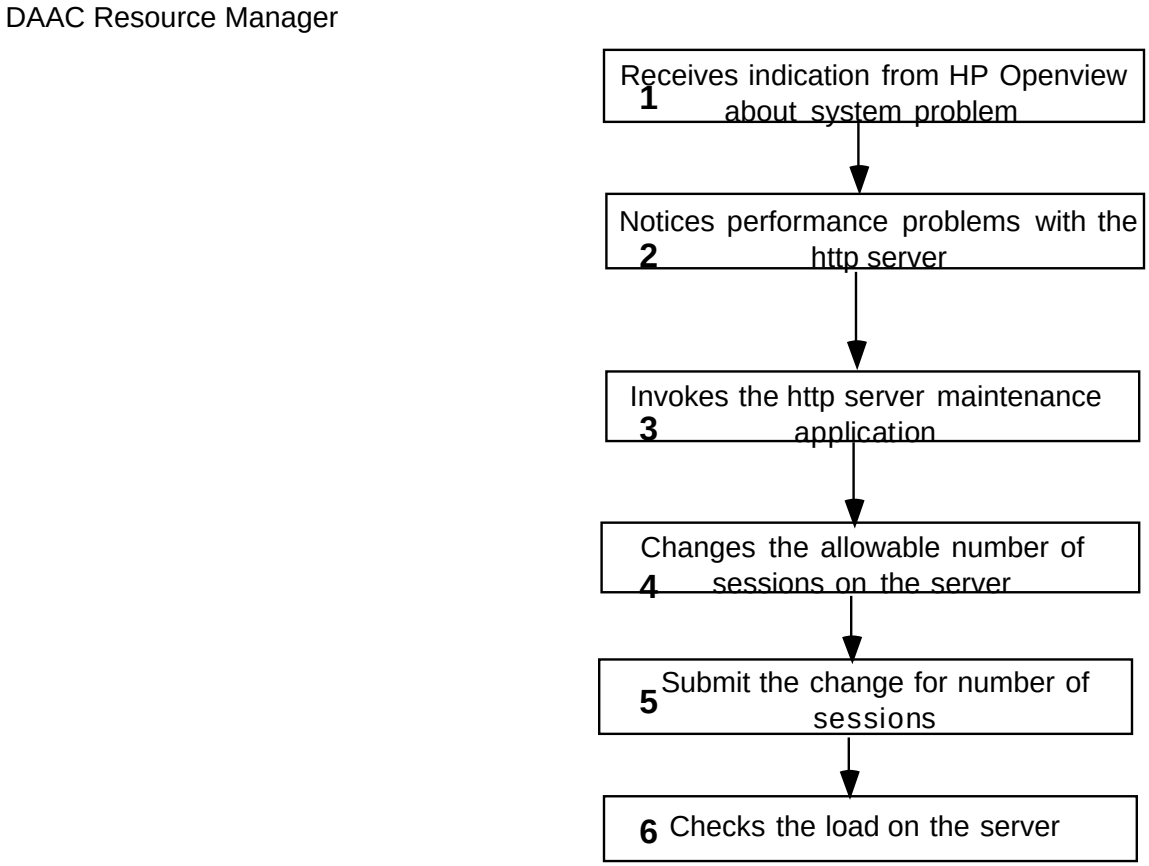

Figure 6.2.4.4-1. Data Management Server Saturation Workflow

Data Activity

Table 6.2.4.4-1. Data Activity for Data Management Server Saturation

Object Name/Tool	Data Element	Activity					
		1	2	3	4	5	6
HP OpenView	Data Server Icon	D					D
	http Server load		D				D
DSS Desktop	http server Maintenance			I			
DSSrfactory	Number of sessions				E		
	Submit					I	

6.2.5 Request Segmentation

The request segmentation scenario describes the proposed method for Data Server handling of a large user science data request. For a request to be segmented either the volume of the ordered data or the number of the ordered files must exceed a specified threshold. Such request will be segmented on file boundaries. Request segmentation will be automated in Release B.

This scenario effects the Science Operations scenario in that a large request will be decomposed into smaller requests. The Science end-user would then receive a product for each of the apportioned requests. This process is being employed to protect the system from single point overloads.

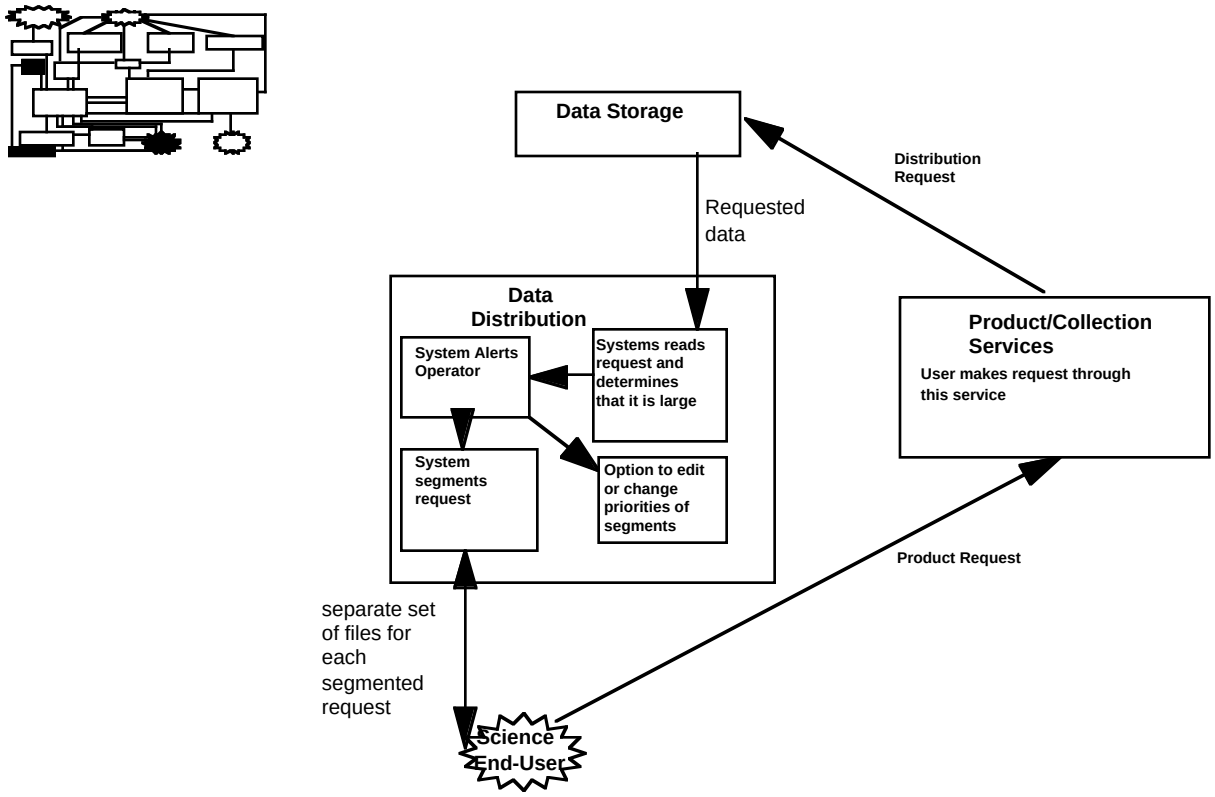

Figure 6.2.5-1 Request Segmentation Context Diagram

6.2.5.1 Description

This scenario describes what happens to large data requests. Large requests that require segmentation are flagged by data volume or by the number of files. When a request is flagged, the requester of the electronic transfer is notified of the request segmentation. The requester is notified separately (normal request notification) of each electronically transferred request segment. The requester will have the option to cancel the request at any point. Any hard media distribution of a

segmented request is handled as a normal request. This process is highly automated. The DAAC Ingest/Distribution Technician is then notified of the large request and presented a recommended partitioning scheme. The technician then has the option to accept this scheme or to repartition the request using their own judgment. In this case, the technician chooses to accept the partitioning recommended by the system. The system then creates subrequests and normal processing continues. The only assumption this scenario makes is that the system is operating in nominal (operational) mode, with all equipment operational.

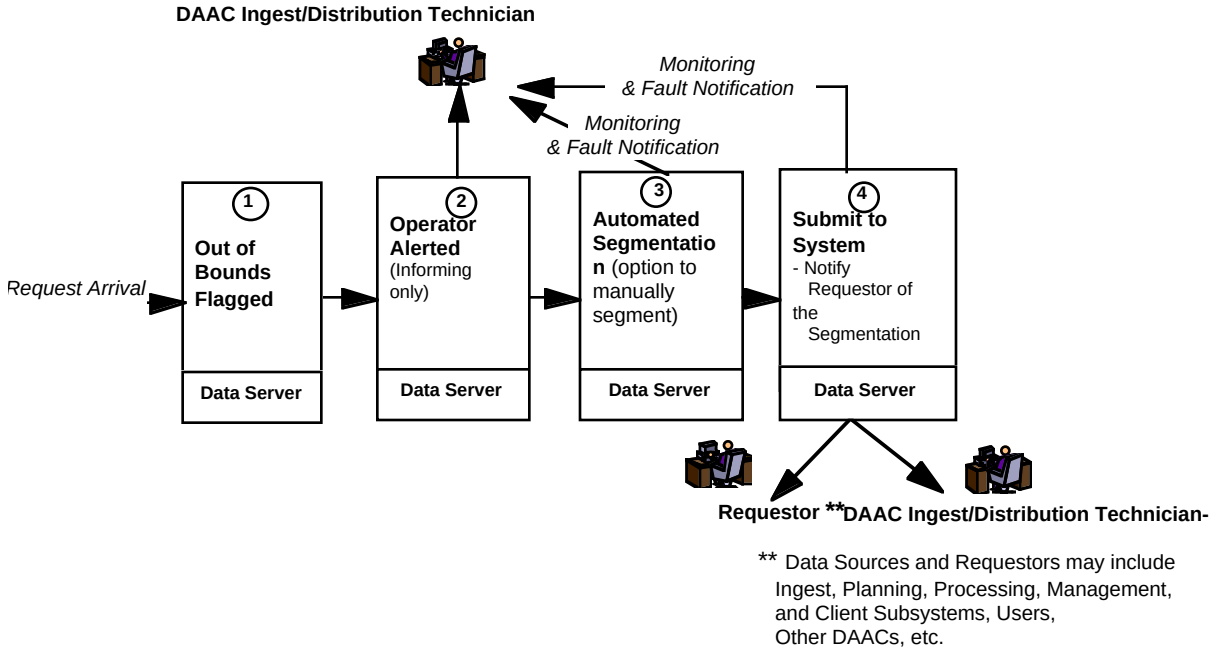

Figure 6.2.5.1-1. Request Segmentation Functional Flow Diagram

6.2.5.2 Operator Roles

DAAC Ingest/Distribution Technician - Receives notice of a large request that will be segmented. The technician also has the option to repartition the request when notified.

6.2.5.3 Detailed Points of View

Detail points of view chart that details all steps of the scenario, showing the interaction of all relevant roles.

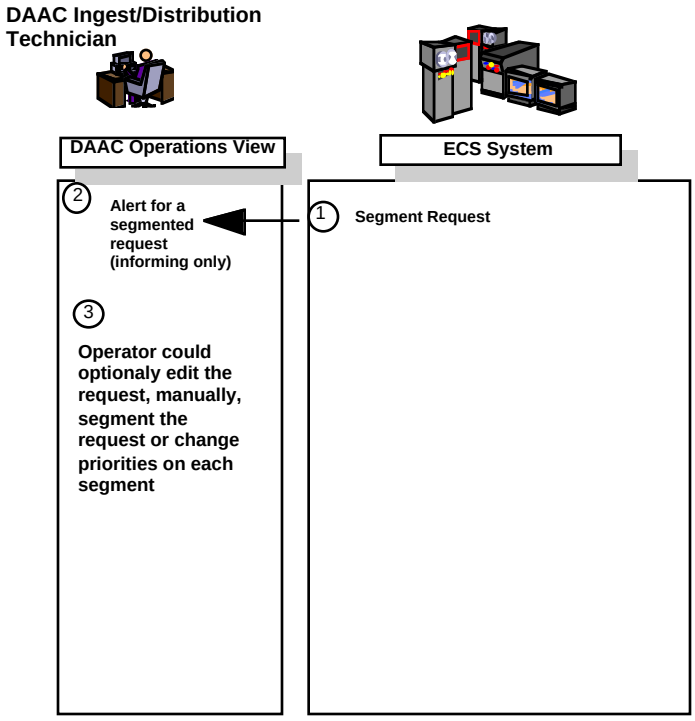

Figure 6.2.5.3-1. Request Segmentation Points of View Diagram

6.2.5.4 Request Segmentation Workflow

The following workflow depicts the optional actions that a DAAC Ingest/Distribution Technician can use to manually segment, modify segments or change priorities a segmented request. However, the operator does not need to do anything to segment the request automatically. The automatic segmentation is felt to be the nominal scenario.

This section is continued on the next page.

Workflow

Activity - Request Segmentation Information

Role - DAAC Ingest/Distribution Technician
- DAAC Archive Manager

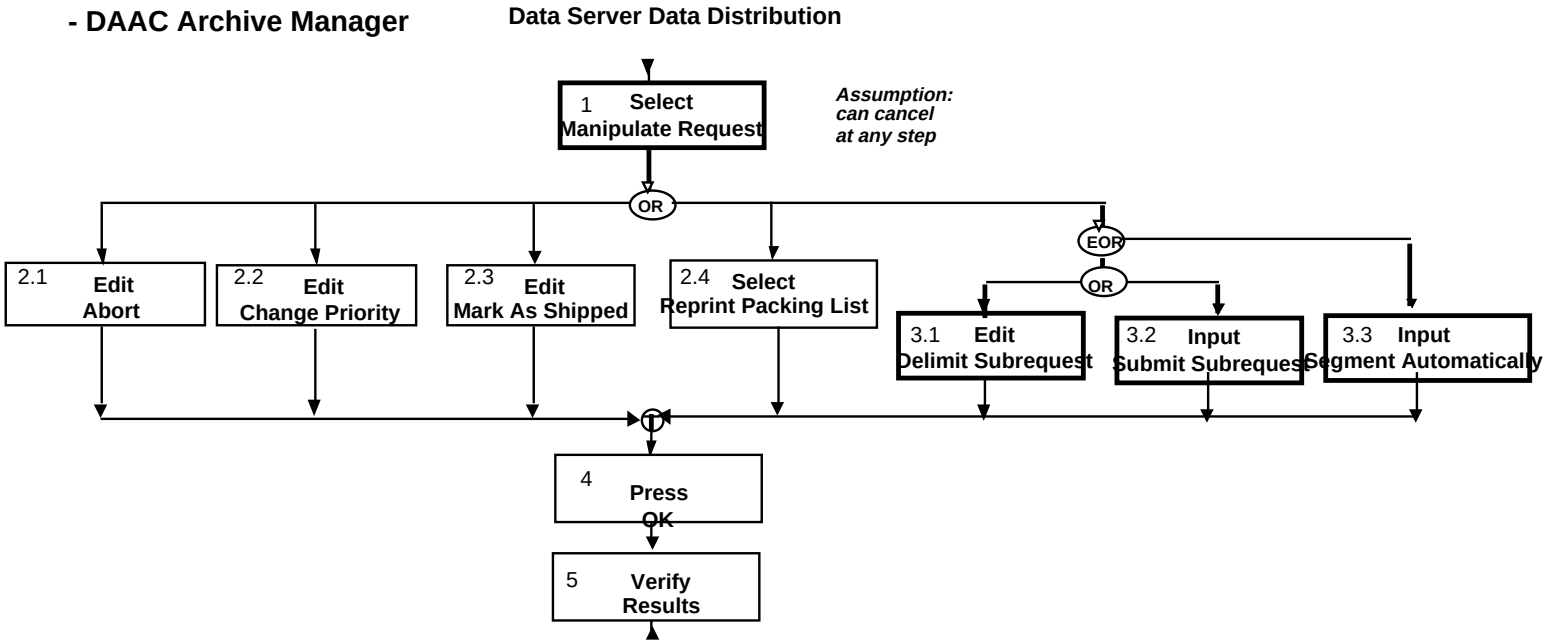

Figure 6.2.5.4-1. Request Segmentation Workflow

Data Activity

Table 6.2.5.4-1. Data Activity for Request Segmentation

Object Name	Data Element	Activity									
		1	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4	5
DsGuAdminGUI	View/Manipulate Subrequests	I									
DsDdDistRequest	Status	D									D
	Media	D									D
	Request ID	D									D
	Requester	D									D
	Priority	D									D
	Size	D									D
	Submission Time	D									D
	# of Files	D									D
	# of Volumes	D									D
	# of Subrequests	D									D
	Abort		E								
	Change Priority			E							
	Mark as Shipped				E						
	Reprint Packing List					D					
	Delimit Subrequest						E				
	Submit Subrequest							E			
	Segment Automatically								E		
	Press OK									I	

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